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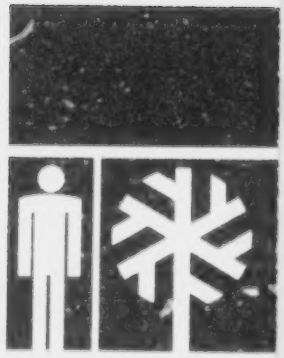
environmental assessment

APOSTLE ISLANDS



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june 1989

APOSTLE ISLANDS NATIONAL LAKESHORE • WISCONSIN

UNITED STATES DEPARTMENT OF THE INTERIOR / NATIONAL PARK SERVICE

SUMMARY

This *General Management Plan / Environmental Assessment* for Apostle Islands National Lakeshore considers five alternatives to guide future resource management efforts, access and transportation to the islands, visitor use and interpretation, and land acquisition and boundary modifications. The primary differences between the alternatives are related to the range of visitor opportunities that would be offered and the level of support facilities. The following alternatives were considered:

Alternative A – Existing Conditions (No Action). Present conditions would be continued without major changes in management direction.

Alternative B – Primitive Emphasis. Few facilities and programs would be provided on the islands, and the visitor experience would focus on solitude and self-reliance.

Alternative C – Island Emphasis. Programs and facilities would encourage visitors to spend time on the islands.

Alternative D – Mainland Emphasis. Overnight and recreational use would be accommodated on the mainland, and day use opportunities would be provided on the islands.

Alternative E – Parkwide Emphasis (NPS-Preferred Alternative). Programs and facilities on the mainland would give visitors an opportunity to appreciate the beauty and power of Lake Superior, while programs and facilities on the islands would allow visitors to choose the type of experience most suited to their tastes, ranging from day trips to multi-day camping trips.

In addition a minimum requirements alternative was evaluated that would be similar to alternative E, but it would not subsidize public transportation to the islands, and mainland development would be minimized.

Under all alternatives natural resources would be managed basically according to the 1986 *Resources Management Plan*, and cultural resources listed on the National Register of Historic Places (including all the light stations on the islands) would be protected. The major actions of the alternatives are summarized in table I.

None of the alternatives would have significant adverse environmental consequences. Measures would be taken under all alternatives to protect sensitive natural areas, such as sandspits. The effects of shoreline development on the littoral drift would be monitored and studied, and appropriate mitigating measures would be taken where needed. Submerged cultural resources within 0.25 mile of the shorelines would receive more protection under alternatives B through E because the National Park Service would seek authority to identify and protect significant sites.

The widest range of visitor opportunities and support development would be offered under alternatives C, D, and E, with alternative E making opportunities available on both the mainland and the islands. Under these alternatives visitors would have opportunities to learn about the lakeshore's significant natural and cultural resources, as well as the shoreline dynamics that have created the present landscape.

Table I: Summary of Major Alternative Actions

	Alternative A – Existing Conditions (No Action)	Alternative B – Primitive Emphasis	Alternative C – Island Emphasis	Alternative D – Mainland Emphasis	Alternative E – Parkwide Emphasis (NPS-Preferred Alternative)
Resource Management					
Natural Resources	Under all alternatives ensure the protection and preservation of natural resources, in accordance with 1986 *Resources Management Plan*. Monitor use of sandspits and take protective actions wherever use is destroying or causing drastic changes in beach grass composition.				
Cultural Resources	Preserve sites on National Register, including all light stations. Preserve and interpret other sites according to their significance. Conduct an underwater resource inventory, but provide no formal protection for submerged resources.	Same as alternative A except develop an agreement with Wisconsin to manage and protect known submerged cultural resources. Complete a special history study of the light stations.	Seek to acquire all lake bottom lands within the lakeshore and protect all submerged cultural resources. Interpret and maintain historic landscapes; interpret and rehabilitate/ stabilize historic structures; interpret historic sites. Complete a special history study of the light stations and an underwater resources inventory.	Same as alternative C except acquire only enough lake bottom land to protect known submerged cultural resources, and conduct interpretive tours of selected historic structures.	Same as alternative C, except seek to acquire all lake bottom lands in the lakeshore or enter into a cooperative agreement with the state of Wisconsin for their protection.
Access and Circulation					
Land Access	Make no changes in land access routes.	Improve lakeshore access by way of Meyers Road.	Improve lakeshore access at Little Sand Bay.	Improve lakeshore access by way of Meyers Road, Sand Point Road, and at Little Sand Bay.	Same as alternative D but develop Meyers Road and Sand Point Road as all-season access roads.
Water Access	Continue tour boat access to three islands.	Same as alternative A.	Provide tour boat access to seven islands, at a moderate passenger fee.	Provide tour boat access to six islands at a moderate passenger fee.	Provide tour boat access to four islands at a moderate passenger fee.
Water Taxi	Continue water taxi service.	Same as alternative A.	Same as alternative A.	Same as alternative A.	Same as alternative A.

	Alternative A – Existing Conditions (No Action)	Alternative B – Primitive Emphasis	Alternative C – Island Emphasis	Alternative D – Mainland Emphasis	Alternative E – Parkwide Emphasis (NPS-Preferred Alternative)
Visitor Use and Interpretation					
Mainland	Continue visitor center and headquarters in the old Bayfield County courthouse and visitor contact station at Little Sand Bay.	Same as alternative A.	Same as alternative A except construct a new visitor contact station at Little Sand Bay.	Relocate Bayfield visitor center and headquarters to a facility with a view of the islands. At Little Sand Bay remodel existing visitor contact station, develop a 50-site campground, and construct a 10- to 12-mile shoreline trail; over long term develop new harbor complex, visitor contact/ranger station, and 30-site picnic area. On Meyers Road near Squaw Bay develop a small visitor information station, trailhead, and 20-site picnic area.	Same as alternative D except continue lakeshore headquarters in the old Bayfield County courthouse and over the long term construct a new lakeshore interpretive center in Little Sand Bay to replace the Bayfield visitor center; provide visitor information station in Bayfield.
Islands with Structured Use and Tour Boat Access; Some Facility Development	Raspberry, Manitou, and Stockton islands.	Same as alternative A.	Same as alternative A plus Sand, Oak, Basswood, and Outer islands.	Same as alternative C except no tour boat access to Outer Island.	Same as alternative D.
Islands with Independent Use and Access; Little Facility Development	Sand, York, Oak, Hermit, Basswood, Michigan, Outer, Cat, Ironwood, Otter, South Twin, Rocky, and Devils islands.	Same as alternative A.	York, Hermit, Michigan, Ironwood, Cat, Otter, Rocky, and Devils islands.	Same as alternative C, plus Outer and South Twin islands.	Same as alternative D, but slightly more development of visitor facilities.
Islands Reserved for Future Use and Development	Bear and Long islands.	Same as alternative A.	Same as alternative A	Same as alternative A.	Same as alternative A.
Islands with Restricted Use	Eagle, Gull, and North Twin islands.	Same as alternative A.	Same as alternative A.	Same as alternative A.	Same as alternative A.

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INTRODUCTION

PURPOSE OF AND NEED FOR THE PLAN

Apostle Islands National Lakeshore is on the tip of Bayfield Peninsula in northern Wisconsin and includes 21 of the 22 Apostle Islands in Lake Superior. Established on September 26, 1970, the purpose of the lakeshore is "to conserve and develop for the benefit, inspiration, education, recreational use, and enjoyment of the public" these islands and their related geographic, scenic, and scientific values (Public Law 91-424; see appendix A). The national lakeshore displays a variety of scenic features, and there are examples of some of the earliest and latest events of geologic history found in the lower 48 states. The shorelines have eroded into interesting rock and colorful cliff formations, and caves and arches are interspersed with coves and beaches. Lush hardwood forests cover some islands, and wildlife includes a diverse population of nesting and migrating birds, plus a variety of mammals, amphibians, and fish.

PURPOSE OF THE PLAN

A *Master Plan* was prepared in 1971 in response to section 7 of the authorization act (PL 91-424). Since then, the National Park Service has gained on-site experience with lakeshore operations, baseline information on resources has been gathered, additional visitor use patterns have begun to form, the local economic situation has changed, and Long Island was included in the lakeshore. Also, in 1978 a development concept plan was prepared for Little Sand Bay on the mainland. These changes, plus additional information, have made the original plan out of date.

The purpose of a general management plan is to guide the management of visitor use, the protection of natural and cultural resources, facility development, and lakeshore operations. Through management zoning, the lakeshore's resources have been evaluated, and the kinds of visitor activities that would be compatible with the long-term protection of these resources have been determined. All planning has been done in accordance with the legislative mandate for the lakeshore and its management objectives (see appendix B). The need for and the appropriateness of development for winter use has also been evaluated.

NEED FOR THE PLAN: PLANNING ISSUES AND MANAGEMENT CONCERNS

The following planning issues and management concerns were identified during the initial stages of this planning effort. These issues and concerns were expressed by a variety of agencies, organizations, and local officials during meetings in April and June 1986, as well as by the lakeshore staff.

Visitor Use and Interpretation

Apostle Islands National Lakeshore is a relatively new unit of the national park system, with an annual average visitation over the past five years of about 124,600. However, visitor use patterns are changing. In 1987 the state of Wisconsin increased its tourism promotion efforts for the northern Wisconsin area. In addition, the merchants and businesses in the Bayfield area formed a tourism promotion organization named Apostle Island Country. Superb summer weather and increased publicity resulted in a 30 percent increase in regional tourism and a 21 percent increase in park visitation for the 1987 season.

The demand for charter sailboats has been increasing; however, the number of charter boats has remained relatively stable since there are fewer incentives for owning and operating a boat for charter. Consequently, charter sailboats are now being used more consistently throughout the week, rather than primarily on weekends. A survey of tour boat users conducted in summer 1987 discovered that peak use occurred Tuesday, Wednesday, and Thursday.

Because access to the lakeshore and the islands is difficult, many visitors leave the region without understanding the uniqueness of the Apostle Islands.

The key issue for visitor use and interpretation is to establish a quality experience that gives visitors a comprehensive introduction to the lakeshore and that is consistent with protecting natural and cultural resources. Facility and program development will be guided by the kind of visitor use experience that is offered.

Carrying Capacity

Different types of carrying capacity (based on resources, visitor use, and facilities) can be examined to determine if resources are capable of withstanding current use, visitors are having an enjoyable experience, and facilities are adequate to accommodate use. Carrying capacities based on park resources and visitor use cannot be established for Apostle Islands National Lakeshore at this time because baseline data are lacking. However, facility-based carrying capacities have been calculated for each alternative and are listed in this general management plan.

Access

Visitors who do not have access to private boats must depend on concession-operated boats to visit the islands. Many people, particularly young families, may not be able to afford the cost of these boat tours. One of the lakeshore's management objectives is for a concessioner to provide regularly scheduled and inexpensive transportation throughout the islands. The present tour boat system is a financially marginal operation, and it cannot afford to offer a full range of transportation services to the islands. The most cost-effective tours allow for little or no time on any of the islands, yet these tours are not sufficiently profitable to subsidize more costly routes that would provide longer or more frequent stops. Frequently, the only transportation for visitors who wish to be dropped off to hike or camp is a water taxi service, which is very expensive, thus limiting the number of visitors who can use this service.

Access to the mainland unit is over several miles of poorly maintained roads, which discourages many visitors and is a source of complaints. The roads are under the jurisdiction of local townships, which do not have the funding to make improvements, and the National Park Service has no authority to make or fund improvements to them.

Resource Management

The state of Wisconsin owns the bottom of Lake Superior throughout the lakeshore, yet adequate state and federal regulations do not exist to protect submerged cultural resources, such as shipwrecks, that have been discovered by divers. The problem of protecting submerged cultural resources is made more difficult by the lack of appropriate

legislation and cooperative agreements between the National Park Service and the state of Wisconsin.

No comprehensive historic resource study exists for the entire national lakeshore. Historic structures have been identified over the years as archeological and historical surveys were conducted for specific construction projects or as special archeological or history studies were completed for specific resource areas within the lakeshore.

Record high Lake Superior water levels have resulted in severe shoreline erosion. Both natural and cultural resources have been affected, and light stations are particularly vulnerable. Without measures to mitigate, salvage, or stabilize the affected resources, they could be lost. Responsibilities for maintaining certain light stations have not been clarified between the National Park Service and the U.S. Coast Guard; this could adversely affect the long-term protection of these resources. In addition to the light stations, other sites on the National Register of Historic Places face deterioration because of the harsh climate and encroaching vegetation.

The productive littoral zone and much of the prime spawning ground for fish such as lake trout, whitefish, and herring lie within or very near the lakeshore boundary. These areas are vitally important to maintaining the lake's aquatic populations.

The lakeshore provides nesting habitat for the federally endangered bald eagle and piping plover. These species are sensitive to disturbances and need continued protection.

Camping and boat landings on island sandspits are adversely affecting beach vegetation at several sites. Specialized beach vegetation anchors the sand and helps reduce erosion. Even though the areas being affected are usually not more than a few acres in size, any loss of vegetation can have long-term adverse consequences.

Boundary Adjustments and Land Acquisition

No boundary issues have been identified; however, boundary modifications may be considered as potential solutions to other problems. Likewise, land acquisition may be considered to protect critical resources, in accordance with the lakeshore's *Land Protection Plan*.

Mineral rights have not been acquired by the federal government for all lands within the lakeshore.

Administrative Facilities

Administrative facilities need to be located in areas where resource protection needs can be met and the visitor experience can be fully complemented. Maintenance facilities, quarters, and a supervision base for island operations and headquarters are also required.

OTHER CONSIDERATIONS

Additional Influences on Planning

Several other factors affect planning for Apostle Islands National Lakeshore, including legislative and administrative constraints, climate, and geography. The major influences on this planning effort are listed below.

A development ceiling of $5 million for the lakeshore was established by PL 91-424.

Hunting, trapping, and fishing are permitted under PL 91-424.

Regulation of Lake Superior water levels by the International Joint Commission, when applicable and when they can be controlled, is beyond the jurisdiction of the National Park Service.

Other influences on planning include the short summer season, weather variability, limited safe natural docking sites, remoteness of the islands (especially the outer islands), and commercial fishing.

Wilderness Suitability

The National Park Service as a matter of policy evaluates all lands and waters under its jurisdiction for wilderness suitability, in accordance with the Wilderness Act (PL 88-577) and Department of the Interior and NPS guidelines for wilderness preservation and management. These policies and guidelines delineate existing and future conditions and uses that are compatible with wilderness designation. The following factors are particularly relevant to determining the wilderness suitability of lands in Apostle Islands National Lakeshore:

Historic Features. Historic features that are primary visitor attractions, such as light stations, are not recommended for wilderness designation by Congress. However, an area that attracts visitors primarily for the enjoyment of solitude and unconfined recreation in a primitive setting and that may also contain historic features may be recommended for wilderness. Typical historic features that may be included are archeological sites, historic trails, travel routes, and minor structures. Historic trails may serve and be maintained as part of the wilderness trail system. However, if the planned scope and standard of maintenance would result in obvious evidence of human work, the trail or other feature should not be recommended for wilderness (for example, maintained historical landscapes).

Landownership. Only lands where the National Park Service or other federal agencies have complete control are eligible for wilderness designation. Lands are not suitable for wilderness designation if the federal agency owns a less-than-fee interest (scenic easements), the mineral rights have been retained by nonfederal owners, or there are state or private owners.

Existing developments. Areas where evidence of people and their developments are obvious and are expected to remain are not suitable for wilderness designation. NPS development zones are not compatible with wilderness designation (see Management Zoning map).

Motorized use areas. Areas where aircraft, motorized watercraft, or tools are routinely used for recreational or maintenance purposes are not suitable for wilderness designation unless those uses would be eliminated. The Wilderness Act states that where the use of aircraft and motorboats has already become established, "these uses . . . may be permitted to continue subject to such restrictions as the Secretary [of the Interior] deems desirable." This does not mean that previously established motorboat and aircraft uses of an area must be allowed to continue upon the designation of that area as wilderness, or that water areas must be excluded from wilderness recommendation where motorboats are allowed. Any recommendation to allow established aircraft or motorboat use to continue in wilderness would have to be based on a finding that the purpose, character, and manner of such use is suitable to the specific wilderness under consideration.

The NPS boundary at Apostle Islands extends 0.25 mile from the shoreline of each island and the mainland unit, and aircraft or motorboat use could only be restricted within that boundary. Because there is substantial recreational use as well as commercial use of motorboats among the islands, islands otherwise qualified for wilderness would be subject to the sight and sound of motorboats and therefore might not be suitable for wilderness designation.

After considering these factors the National Park Service has proposed a wilderness study for lands within Apostle Islands National Lakeshore because they may meet the qualifications for wilderness designation. This document does identify areas that offer outstanding opportunities for primitive recreation. Some or all of these tracts, if determined to be consistent with providing a diverse mixture of recreational opportunities, would be placed in a primitive subzone of the natural zone and would be managed to protect their wilderness characteristics. Lands placed in the primitive environment subzone would vary with each alternative.

PLANNING ALTERNATIVES AND SCOPE OF THIS DOCUMENT

The management concerns and planning issues, as well as the other planning considerations, guided the development of five general management alternatives for Apostle Islands National Lakeshore, plus the minimum requirements alternative. Each alternative has a management zoning scheme and provides direction for the management of natural and cultural resources, access to mainland facilities and the islands, visitor use, boundary modifications and land acquisition, and park operations. The major differences between alternatives are related to the range of visitor opportunities and support facilities that would be offered; consequently, the alternatives have been characterized in terms of visitor use (for example, an island emphasis versus a mainland emphasis).

Alternative A – Existing Conditions (No Action). Alternative A would continue present conditions without major changes in management direction.

Alternative B – Primitive Emphasis. Facilities and programs would support a visitor experience focusing on the remoteness of the islands, and visitors would be encouraged to be self-reliant during their stays on the islands.

Alternative C – Island Emphasis. Programs and facilities would encourage visitors to spend time on the islands to learn how unique and isolated they are.

Alternative D – Mainland Emphasis. The mainland unit would be managed to emphasize overnight and recreational use, while the islands would be managed primarily for day use.

Alternative E – Parkwide Emphasis (Preferred Alternative). This alternative combines proposals of both alternatives C and D. Programs and facilities on the mainland would offer an excellent shoreline experience, especially a feeling for the beauty and power of Lake Superior. Programs and facilities on the islands would offer a range of experiences, and visitors would be able to choose the type of visit most suited to them.

Minimum Requirements Alternative. This alternative would be similar to alternative E except a public transportation service to the islands would not be subsidized. On the mainland the level of development would be reduced.

SIGNIFICANCE OF THE LAKESHORE

Apostle Islands National Lakeshore, which encompasses a 720-square-mile area on the Bayfield Peninsula and Lake Superior in northern Wisconsin, displays a variety of scenic features, and it records some of the earliest and latest events of geologic history in the conterminous 48 states. Originally, the Apostle Islands were part of the Bayfield Peninsula, but in a relatively brief period of geologic time, the meltwaters of successive stages of glaciation eroded channels in the peninsula and formed the islands group. Today the lakeshore includes 69,372 acres, of which 27,232 acres are submerged (lakeshore boundaries extend 0.25 mile from the shore of the mainland and from each island). There are 42,140 acres of land above the high waterline – 2,568 acres on the mainland and 39,572 acres on 21 of the 22 Apostle Islands (Madeline Island is the only island not included in the lakeshore).

The 12-mile-long mainland unit is a narrow (usually less than 0.25 mile wide) strip stretching from Little Sand Bay to Squaw Bay on the northwest shore of the Bayfield Peninsula. The southwestern half of this area contains the highest cliffs in the region. The spectacular, sheer sandstone walls are crowned with forest to the breakline directly above the water. The cliffs are best appreciated from the water.

The islands have a sandstone base that was deposited about 600 million years ago and is overlain with glacial drift and a layer of decomposed organic matter that supports lush vegetation. The shorelines have eroded into interesting rock and colorful cliff formations, and caves and arches are interspersed with coves and beaches. The islands range in height from 50 to almost 500 feet above the surface of Lake Superior.

Vegetation on the Apostle Islands is at the continental northwestern limit of the hemlock/white pine hardwood forest and the southern limit of the circumpolar boreal forest. Most of the lakeshore's densely forested areas were cut over for commercial grade timber earlier in the century, and forests are now in second- and third-growth stages. Only Raspberry, Devils, North Twin, Eagle, and Gull islands were not logged.

Island wildlife includes a diverse population of nesting and migrating birds and somewhat unique populations of mammals, amphibians, and fish. Wildlife species are characteristic of the southern limits of the boreal and the northern limits of the hardwood/hemlock forests. Aquatic species are typical for waters of good quality. The federally threatened and state endangered bald eagle is successfully nesting on the Apostle Islands.

The abundant natural resources attracted aboriginal humans to this area. During the historic period, people constructed residences and started farms, fishing operations, brownstone quarries, and logging camps on these islands. To provide for safe recreational and commercial navigation of Lake Superior, light stations were established in the 19th century on various islands. Beneath the waters of Apostle Islands National Lakeshore are remnants of these activities, as well as shipwrecks. These aboveground and submerged cultural resources provide an important facet to the national lakeshore.

Five light station complexes, one lighthouse on Long Island, and seven historic sites (including a farm, fishing camps, an archeological camp, and a quarry) are listed on the National Register of Historic Places, and one archeological site has been nominated but not yet officially listed. In addition, one archeological site and three brownstone quarries are eligible for listing.

MAPS

TRANSPOSED TO

END OF VOLUME

ALTERNATIVES

INTRODUCTION

A major objective of this plan is to allow for visitor use that is compatible with the protection of natural and cultural resources. Each alternative would meet that objective in different ways. In this section the desired visitor experience for each alternative is defined, followed by a discussion of specific management and development actions.

A general management plan is a conceptual plan. The sizes and locations given for proposed facilities are approximations that are to be used for generating cost estimates and for understanding the relative scale of development. Before new facilities are constructed, site planning and specific environmental assessments would be conducted to ensure that facility construction and use would have little or no impact on resources, especially wetlands, floodplains, threatened or endangered species, and significant cultural resources. Operational facilities (ranger stations, employee quarters, etc.) on the islands would be limited to those necessary to protect resources and visitors and to provide interpretation. Where new buildings are proposed, construction would incorporate current energy conservation materials and methods, and the structures would be handicap accessible. Before any construction was initiated, archeological surveys would be conducted to provide necessary information to avoid or mitigate any adverse effects.

The reservations of both the Red Cliff and the Bad River bands of the Lake Superior Chippewa are near the national lakeshore, providing an opportunity for the bands and the National Park Service to jointly develop some facilities and to pursue cooperative efforts to protect resources. The National Park Service would pursue such cooperative activities when feasible.

Tour boat stops proposed in the alternatives would be subject to periodic review and would be revised as appropriate to meet management objectives, resource protection, and visitor use needs. Details of tour boat operation for each alternative, including costs, are analyzed in appendix C. Cost estimates for the action alternatives (B-E) are included in appendix D. The major actions of all the alternatives are summarized in table 11 at the end of this section.

ALTERNATIVE A – EXISTING CONDITIONS (NO ACTION)

Under this alternative existing conditions and present management strategies would be continued. Apostle Islands National Lakeshore would continue to provide recreational opportunities, including boating, hiking, camping, fishing, and hunting. Limited concessioner-operated tours would be available for visitors without boats. Most visitors to Apostle Islands would see only the coastal fringe of the islands and mainland because of access difficulties. Visitors would have the opportunity to be briefly exposed to island resources at the Bayfield visitor center and at the Little Sand Bay visitor contact station. The predominant visitor experience would continue to be the superb sailing among the islands and opportunities for shoreline camping and picnicking, with little emphasis on mainland use.

MANAGEMENT ZONING

Management zoning establishes the broad framework for specific planning decisions about the use and development of lakeshore lands. Four major zones are designated: natural, historic, park development, and special use. Within these zones, subzones may be identified to further clarify intended use and development.

Existing management zoning is described under the no-action alternative, and only changes to that plan are described for each alternative. The existing management zones and subzones for the lakeshore are described below and are shown on the Management Zoning map. Acreages for each zone are shown in table 1.

Table 1: Management Zoning – Alternative A

Zone/Subzone	Acres	Percentage of Lakeshore
Natural Zone		
Outstanding natural feature subzone	2,825	4.1
Protected natural area subzone	300	0.4
Natural environment subzone	37,886	54.6
Subtotal	41,011	59.1
Historic Zone	370	0.5
Park Development Zone	238	0.3
Special Use Zone		
State-owned submerged lands subzone	27,232	39.3
Reservation of use subzone	206	0.3
Inholdings (federal, local, and private) subzone	315	0.5
Subtotal	27,753	40.1
Total	**69,372**	**100.0**

Natural Zone

Lands in the natural zone are managed to conserve natural resources and processes. Uses and facilities that do not adversely affect these resources and processes are permitted. Within the natural zone, three subzones are designated to more specifically define use:

Outstanding Natural Feature Subzone. Management in this subzone provides for public appreciation and interpretation of geological or ecological features possessing unusual intrinsic value or uniqueness. Some of the features included in this subzone are sandstone cliffs, tombolos, sandspits, ancient bogs and beaches, and virgin hemlock stands.

Protected Natural Area Subzone. Lands and waters in this zone are managed to perpetuate geological or ecological values, with or without minimal human intrusion. These lands and waters are unusually significant. Gull, Eagle, and North Twin islands fall into this subzone.

Natural Environment Subzone. Recreational activities that are compatible with natural resources are allowed in this zone. Where recreational activities are not occurring, the areas are managed to conserve natural resources.

Historic Zone

The management emphasis in the historic zone is to preserve, protect, and interpret cultural resources and their settings. This zone contains all cultural resources that are important because of their aesthetic values, which merit full communication to park visitors, or because of their association with persons, events, or periods in human history. Historically significant structures may be used, with necessary modifications, or leased for contemporary public or administrative activities or functions, as long as the qualities that make these resources qualify for listing on the National Register are perpetuated. Logging camps, fishing camps, light stations, homesteads, quarries, and archeological sites are included in this category.

Park Development Zone

Lands in this zone are used to provide and maintain park facilities to serve the needs of park management and visitors. Included are areas where park development or intensive use has substantially altered the natural environment or the setting for historically significant resources. This zone includes roads, parking areas, major docks, visitor facilities, and administrative and maintenance buildings.

Special Use Zone

This zone allows for uses that are carried out by other governmental agencies or private interests on lands within the lakeshore boundaries. NPS administrative control over land uses in this zone either is lacking or is secondary to that of another party. Included in this zone are three subzones – a state-owned submerged lands subzone, a reservation of use subzone, and an inholdings subzone. Included in the reservation of use subzone are properties that have been reserved under use and occupancy agreements or life estate terms (see appendix E for a listing of the life estate properties and the use and

occupancy properties and their expiration dates). Management of these properties reverts to the National Park Service upon expiration of the reservation terms.

RESOURCE MANAGEMENT

Natural Resources

NPS policies and regulations would be followed in the administration and management of natural resources. In general, the long-term natural resource objective of the National Park Service is to restore and maintain the biologic diversity of the dynamic ecosystem that would exist today had not human activities such as logging intervened. The significance of lakeshore resources in terms of the biologic diversity of the fragmented natural ecosystem of the western Great Lakes area is currently under study.

Natural resource study and protection programs have already been developed and assessed in the *Resources Management Plan and Environmental Assessment* (NPS 1986), which is now being implemented. Additional funding may be needed to implement these programs. Following is a brief description of the issues and actions proposed in the *Resources Management Plan*; more detailed information can be found in that plan.

Lakeshore vegetation is much different from what existed before human influence and intervention. Past logging and other events such as fire and drought have left only fragments of the original vegetation. The present forest cover is largely second-growth deciduous trees. NPS policy emphasizes that vegetation in natural areas be restored to pre-interference conditions. Natural reforestation of native vegetation would take a very long time, and some species may not regenerate naturally. The recommended course of action is to manage selected vegetative types in a limited regeneration program. This is a practicable approach in light of the prohibitive costs of large-scale reforestation. Certain islands will be managed to provide representative small stands of natural pristine forest cover. Various management techniques will be used to enhance and reestablish these areas.

The lakeshore's sandspits and beaches have been traditionally used for camping, picnicking, and boat landing/launching. On several islands beaches and sandspits are the only means of access because of steep sandstone cliffs and clay banks. On several sandspits heavy use has destroyed or drastically changed the composition of the beach vegetation that holds the sand in place. Protection is being provided for the heavily used Raspberry Island sandspit, and additional protective actions will be proposed for other intensively used areas.

To determine whether the lakeshore's natural resources are being adversely affected by visitor use, a long-term monitoring program will be established. NPS personnel will survey and monitor existing conditions on beaches, sandspits, and other sensitive areas. Evaluation standards will be developed based on management objectives and the desired visitor experience. If the stability of an area is being seriously threatened by human activity, then restrictions will be imposed. After evaluating the monitoring results and comparing them to the standards, managers will establish the resource carrying capacity for a particular site. The *Resources Management Plan* identifies particular areas, such as sandspits on Raspberry, Oak, Rocky, Outer, and Michigan islands, where impacts of use need to be monitored.

Apostle Islands National Lakeshore has numerous clearings as a result of human occupation, primarily old farmsteads and logging or fishing camps. Many clearings are

being overgrown by forest vegetation. Those clearings that are significant from a historical or cultural aspect will be kept cleared. These selected clearings will be managed and interpreted relative to their cultural and historical background. Some will be developed as campsites.

Terrestrial wildlife populations will respond to direct management actions, such as tree regeneration, prescribed fire, maintenance of clearings, and regulation of hunters and trappers. There will also be indirect impacts from recreational developments, particularly trails and campsites on sandspits and near wetlands. Game and furbearer management plans will prescribe harvests (including the option of closed seasons) of the major herbivores (white-tailed deer, beaver, snowshoe hare), which affect second-growth forest succession on the mainland and the islands. Trails or campsites in critical habitats of reptiles, amphibians, falcons, shorebirds, and other sensitive species will be moved as the need is demonstrated through study.

Which animal species existed in the Apostle Islands before 1850 but have since been extirpated is not well known. Several species, such as moose, pine marten, and wolf, no longer inhabit the mainland area. One formerly extirpated species that is now successfully breeding within the lakeshore is the bald eagle (listed by the U.S. Fish and Wildlife Service as a threatened species). Present efforts at Apostle Islands have been directed toward monitoring the natural rehabilitation of this species. Following ecological studies of piping plover habitat within the lakeshore, a detailed plan will be prepared to manage and protect nesting habitat, especially on Long Island. As other extirpated species are identified through research, the feasibility/desirability of reestablishing them will be determined on a species-by-species basis.

The relatively clear water of the Great Lakes is one of the lakeshore's prime assets. The use of the water and adjacent lands by visitors, including campers, hikers, and boaters, could result in some degradation of water quality. An effort will be made to maintain the highest water quality standards, and an in-house monitoring schedule will be established to ensure that standards are being maintained. The sources of contamination from outside the lakeshore, including acid precipitation, will be located and monitored.

Wildfire is recognized as part of the natural scene and has occurred historically on the islands and the mainland unit. Fire will be considered as a tool in the management of forest vegetation and wildlife. Fire management recommendations could include prescribed burns and prescribed natural fire policies.

The fishery resource within Apostle Islands consists primarily of cold water native and exotic salmonid species. These waters support one of the most productive commercial and recreational fisheries in Lake Superior, and the waters within the 0.25-mile boundary of the lakeshore are vitally important as spawning reefs and shoals for the native lake trout and whitefish. The management of these waters has been primarily the responsibility of the Wisconsin Department of Natural Resources; however, the national lakeshore has concurrent jurisdiction within its boundaries. Research around the islands has been conducted by the U.S. Fish and Wildlife Service through its Ashland Field Station. The Red Cliff Band of Lake Superior Chippewa now employs a trained fisheries biologist to monitor and manage the tribal commercial fishery. The National Park Service will also provide input into fishery management programs, particularly where visitor use and the enhancement of natural reproduction of native and extirpated fish species are concerned.

Even though the Apostle Islands are relatively isolated from industrial plants, they are not immune to the effects of airborne and waterborne pollutants. A coal-fired power plant is

located in Ashland, Wisconsin, some 20 miles south-southwest of the Apostle Islands, and the industrial complex of Duluth, Minnesota, is approximately 70 miles west of the islands. Pollutants may also be carried from more distant midwestern and western industrial centers. The temporary wet-fall air quality monitoring collector on Outer Island has been removed. The park is considering the establishment of a permanent air quality monitoring site. Wet- and dry-fall collectors are located at Isle Royale National Park and Duluth.

Cultural Resources

When funded, an underwater resource study would be undertaken in phases, and inventories and appropriate site reports of submerged cultural resources would be prepared. Wisconsin owns the lake bottom, and no agreement currently exists between the National Park Service and the state as to the management of submerged cultural resources. These sites are not now protected by legislation; however, congressional action is pending on the Abandoned Shipwreck Act of 1987. No formal agreement exists as to law enforcement responsibilities.

Within the national lakeshore there is a wide array of cultural resources, such as light stations, fishing camps, and logging camps. Properties on the National Register of Historic Places, including most of the light stations, will be preserved to prevent deterioration. All other sites would be preserved and interpreted according to their significance. Navigational aids (lights) would continue under the jurisdiction of the U.S. Coast Guard, while the National Park Service would seek the transfer of ownership and management responsibilities for the historic structures associated with these navigational aids.

The lakeshore's collection of natural and cultural objects includes more than 10,000 items, of which approximately 96 percent are related to archeological sites or to historical fishing, lumbering, and farming activities. In addition the collection contains archival materials such as journals, books, charts, and maps. The natural resource portion of the collection includes geological specimens, a herbarium, and specimens of plants, animals, and insects. Currently the collections are stored at Little Sand Bay, with display areas in Little Sand Bay and on Manitou Island. The storage area is scheduled to be moved to a new facility that is being constructed in connection with the maintenance building at Red Cliff. This facility better complies with the standards for collection storage outlined in the *Cultural Resources Management Guideline* (NPS-28) and the *Interpretation and Visitor Services Guideline* (NPS-6). A problem exists in that the new facility is inadequate to store the entire collection.

ACCESS AND CIRCULATION

Land Access

Several roads owned by local governmental jurisdictions provide access to the mainland unit of the lakeshore. All roads within the lakeshore are dirt or gravel, and no changes would be proposed under this alternative.

Little Sand Bay Road provides access from County Road K and Wisconsin 13 to the Little Sand Bay developed area. Russell Township does not have sufficient funds to improve or maintain the gravel road to accommodate large numbers of park visitors.

East Sand Bay Road is a dirt road providing access to the northeast end of Little Sand Bay. An electrical utility easement runs along the road to the Point Detour campground (an adjacent development owned by the Red Cliff Chippewa).

Ridge Road leads to the shoreline and is off Little Sand Bay Road.

Sand Bay Road branches off County Road K and provides access to 0.25 mile of beach within the lakeshore and to a private beach.

Sand Point Road extends from Wisconsin 13 to a lakefront sandy beach, where there is a well, one primitive camping site, and a good view of the islands. The area receives some hunting use in the fall.

Menard Road, off Wisconsin 13, has a view of sandstone bluffs at its end. A historic farmstead is just east of Menard Road, just off North Branch Road.

Squaw Bay Road provides an easement for access to private properties now under use and occupancy agreements (see appendix E).

Meyers Road provides excellent access from Wisconsin 13 to a good sandy beach. An electrical utility easement lies along the road.

Water Access

Public transportation to the islands would continue to be provided by two concessioners. Currently, these are Water Taxi, Inc., and the Apostle Islands Outfitters, Inc. The following cruises were scheduled in 1988 by Apostle Islands Outfitters:

The Grand Tour – daily morning and afternoon trips around Devils Island on the *Island Princess* (June 4 - Sept. 30)

The Inner Island Shuttle – Monday, Wednesday, and Friday afternoon trips to Raspberry and Manitou islands on the *Sea Queen* (June 30 - August 27)

The Stockton/Manitou Shuttle – Tuesday, Thursday, Saturday, and Sunday afternoon trips on the *Sea Queen* (June 30-August 27)

The other concessioner has a contract to provide unscheduled shuttle service to the islands when requested by passengers.

VISITOR USE AND INTERPRETATION

Mainland

The National Park Service maintains some facilities in Little Sand Bay. Lakeshore headquarters and the primary visitor center are in Bayfield in the old Bayfield County courthouse, which is listed on the National Register of Historic Places. (See the Mainland – Bayfield Peninsula map.)

Little Sand Bay. An existing building at Little Sand Bay has been adapted for visitor contact, district ranger headquarters, and concessioner operations (the latter was not used in 1987). Visitors may watch a slide presentation about the park, explore the

interpretive exhibits, and enjoy the view of the lake from the large picture windows. No public restrooms are available when the building is closed. The Hokenson Brothers Fishery, a short walk from the parking lot, is a commercial fishery that operated for more than 30 years and is listed on the National Register. The National Park Service maintains the complex and provides visitors a self-guiding brochure about commercial fishing in the Apostle Islands. A breakwater and dock area are available for public use.

Russell Township owns some land within the Little Sand Bay development, and it maintains a campground, picnic area, and a boat launch. Township signs are sometimes confused with NPS signs, inconveniencing visitors who are searching for NPS facilities.

In addition to the district ranger headquarters, there is park staff housing for three permanent employees and eight seasonal employees. The park maintenance facility in Little Sand Bay is being moved to near Bayfield.

A *Development Concept Plan* for Little Sand Bay was approved in 1978. The NPS development area is divided into two zones. Minimal development was proposed on the 10 acres surrounding the Hokenson Brothers Fishery, which was to be acquired and used for an exhibit on commercial fisheries. Two interpretive trails (each 0.75 to 1 mile) were proposed – one in the marsh and one in the woods. A 30-site picnic area east of the fishery, a 30-vehicle paved parking lot, and road improvements (including paving the access road to Little Sand Bay) were proposed. All other existing buildings were to be moved or obliterated.

Major facility development was proposed on the 60 acres northeast of the fishery, including a combination visitor center and ranger station, an all-weather harbor, and employee housing north-northeast of the harbor development. Maintenance facilities would be constructed east of the housing area. A concession structure would include a ticket and reservation area for the tour boat and water taxi services, a boat rental area, a grocery store, a laundry, and fuel pumps. A 50-vehicle paved parking lot would be developed near the boat launch area, and a 110-vehicle paved parking area would be provided and could be expanded to accommodate another 110 vehicles for day parking. The road system would be upgraded and paved.

The only proposals that have been implemented are the acquisition of the Hokenson Brothers Fishery and the self-guided interpretive walk.

Bayfield. The visitor center and headquarters are in leased space in the original Bayfield County courthouse. The visitor center has exhibits, movie and slide show presentations, free park publications, and a cooperating association sales area. NPS staff are available to answer questions. Interpretive programs are presented during the summer months.

Islands

The islands are grouped into four categories according to the predominant type of visitor use and access:

Islands with structured use and tour boat access – those islands accessible by tour boat and where there are relatively well-developed facilities and programs (designated campgrounds, visitor contact stations, guided interpretive tours, etc.).

Islands with independent access – those islands to which visitors must provide their own transportation and where there are few or no developed facilities.

Islands reserved for future use and access – those islands that are held in reserve for possible future development until use-and-occupancy agreements expire or basic resource studies have been completed.

Islands with restricted use – those islands to which public access is prohibited because of the sensitive nature of the resource.

The categories of use are shown graphically on the Park General map.

Islands with Structured Use and Tour Boat Access; Some Facility Development.

Raspberry Island (296 acres) – Raspberry Island is 1 mile long and 0.5 mile wide. A sandspit on the southeast end provides a good landing site, and the bay on the east side is a favored overnight mooring spot for sailboats. The island's forest is relatively undisturbed by past logging activities, and there is a thick understory of yew.

An 1862 light station complex, which is listed on the National Register, includes the assistant keeper's quarters, a stable, a fog signal building, a magazine, historic privies, another historic outbuilding, vault toilets, and a dock with a boathouse. Erosion is a problem in front of the light station. The building exteriors, as well as the grounds, have been restored to a 1920s appearance, and an interpreter and a maintenance person stationed at the complex give tours and take care of the grounds. Several temporary exhibits have been provided for visitors. A 0.75-mile trail connects the light station with two campsites and a vault toilet on the sandspit. No backcountry camping is permitted on the island. Croquet, a favorite pastime of families stationed on the island, has been set up for visitor use.

Manitou Island (1,363 acres) – Manitou Island, one of the lowest islands, is about 2.5 miles by 1 mile. There is a gravel beach and dock on the southwest end of the island. Nearby are about a half-dozen sheds and cabins that are remains of a historic fish camp, which is listed on the National Register. The camp has been restored and is interpreted. One of the cabins is adaptively used for seasonal quarters, and a well and vault toilet are nearby. A 0.5-mile trail leads from the fish camp to an archeological site on the southeast side of the island. Another 1.8-mile trail is being constructed from the fish camp to a campsite on the northwest side of the island, where there is a capped well. Just off this trail is a historic logging camp.

Stockton Island (10,054 acres) – Many visitors consider Stockton the most beautiful island. It is 7.5 miles long and 2.5 miles wide, and it is the largest of the islands in the lakeshore. Along the island's mostly low and forested shoreline are several sand beaches. A large lagoon provides habitat for several beavers, and bear are known to live on the island. On the southeast end of Stockton is a low sandy tombolo that connects the rocky Presque Isle Point with the rest of the island.

Stockton has the most NPS development and receives the highest number of visitors. The concrete piers at Presque Isle Bay on the island's south side are used by visitors arriving on the tour boat or by private craft. The island has 14.5 miles of trail, including a 0.5-mile self-guiding nature trail by Julian Bay, where the historic shipwreck *Noquebay* lies. A three-pod facility on Presque Isle Point provides a ranger station plus maintenance and interpretive facilities. Seasonal quarters are nearby. A 19-site campground on the banks overlooks Presque Isle Bay and includes a well and vault toilets.

Development at Quarry Bay to the west of Presque Isle Bay includes a dock, four group campsites, a well, a vault toilet, and a tent cabin for seasonal staff. The campground is at the site of a historic logging camp, and a brownstone quarry is nearby. Trout Point, site of a ca. 1917 logging camp, is on the northeast corner of the island and can be reached by trail from Presque Isle Bay. Three campsites have been designated at the point. Historic logging camps are also located in the clearing on the north end of Presque Isle Bay and on the north and northwest coasts. All five camps are remains from Schroeder Lumber Company operations and date from the 1910s and 1920s. Ruins of a historic fish camp are located on the sandspit.

Islands with Independent Use and Access; Little Facility Development.

Sand Island (2,949 acres) – Sand Island is a low-lying island about 3 miles by 2 miles, with many wet areas. A shoal connects the island with the mainland. There are some interesting sandstone caves on the northwest corner of the island. Several private cabins and an old hunting lodge remain on the south shore, two of which – the Shaw farm and the *Sevona* cabin – are listed on the National Register of Historic Places. Public access is restricted by existing use-and-occupancy agreements (see appendix E). Public facilities at East Bay include a dock, three campsites, a well, and a vault toilet. The ranger residence is about 0.5 mile from the campsites and dock.

A light station was built in 1881 on the northern tip of the island. A 2.0-mile trail leads from the dock to the station and traverses boggy areas and a stand of 240-year-old white pine. The station is listed on the National Register and is used for seasonal quarters. A natural rock ledge directly in front provides a fair-weather boat landing, but the lake is often too rough for docking here. Remains of the historic dock can be seen in Lighthouse Bay. Backcountry camping is permitted on the island.

York Island (320 acres) – York Island was once two islands that are now connected by a low stretch of sand. The mile-long island is about 150 yards wide at the northwest end and about 0.5 mile wide at the southeast end. There is a sandspit on the southeast corner. An active bald eagle nest is on the island. Five campsites are located along the sandy north beach, but there are no toilet facilities or well. The island receives little use.

Oak Island (5,078 acres) – Oak Island, 3.5 miles by 2.5 miles, is the highest of the Apostle Islands, with elevations up to 480 feet above the surface of Lake Superior. It is characterized by high clay banks and steep forested shores; a sandspit lies on the southwest corner. The island is heavily forested and cut by steep ravines. Ancient beachlines can be found along what was once the island's east shoreline. An inactive eagle nest is on the south shore, and bears are known to inhabit the island.

The remains of five logging camps have been found on the island. The camps apparently belonged to the John Schroeder Lumber Company and date back to the late 1910s. Only foundations are visible, and artifacts have been found in the camp areas and along the logging roads. Camp 5 on the southeast corner of the island has been the subject of an archeological survey. The Benjamin Armstrong home site is near the sandspit.

The island has 11.5 miles of trail, and the ancient beachlines are evident along the eastern portion of the trail. A dock on the west side of the island is near four group campsites, vault toilets, a well, and a tent cabin for a seasonal ranger. Beaches are available at the sandspit on the southwest corner and along other portions of the shoreline. Eight designated campsites are dispersed along the shoreline. Black-powder hunts for white-tailed deer take place on Oak Island during the fall.

Hermit Island (778 acres) – This island is about 2 miles long and 0.75 mile wide. The shoreline of the western third is steep clay, while the rest is rocky. Gulls nest on the rocks on the north side of the island.

An abandoned brownstone quarry on the southeast side can be viewed from Lake Superior. Massive cribs are the only remains of an old dock that once served the quarry, and they can be seen just below the water surface near the quarry. The ruins of Cedar Bark Cottage, which belonged to quarry owner Frederick Prentice, are immediately east of the quarry. Around the turn of the century the cottage was converted to Cedar Bark Lodge. A historic farmstead is located on the shoreline approximately 0.5 mile northeast of the quarry.

Basswood Island (1,917 acres) – Basswood Island is oval shaped (3.5 miles by about 1.5 miles) and heavily forested, with a rocky shoreline and interesting rock formations on the east side and a natural rock landing on the southeast corner. A new eagle nest was found in 1987 on the southwest shore.

Two brownstone quarries, one of which is listed on the National Register, are on the southeast end of Basswood Island. Five designated campsites are near the quarries. There are a group site and two individual sites, with a well and vault toilet, near a dock on the west side. The west dock, quarries, campsites, two homestead sites, and the McCloud-Brigham farm are connected by a 5-mile loop trail. There is also a dock at the north end of the island.

Basswood could be easily accessible to visitors because of its proximity to the marinas at Bayfield and Redcliff. Black-powder deer hunting is permitted in the fall.

Michigan Island (1,581 acres) – Michigan Island is 3.5 miles long and 1.25 miles wide. A large sandspit on the southwest end encloses a lagoon, but most of the rest of the shoreline is made up of high clay bluffs. On the northern tip of the island is a virgin stand of hemlock and an active eagle nest.

A light station complex on the southwest corner of the island includes an 1850s lighthouse (not in use), a 1926 lightkeeper's quarters (used for park staff), a light tower that was transported to the island in the 1920s, a generator/fog signal building, a storage shed, a tramway, and a pit toilet. The complex is listed on the National Register. A dock was completed in 1987 at the site of the light station's historic dock. A large sandspit on the west end is used for beach landings, and four campsites have been designated in the vicinity. A 1-mile unmaintained trail extends from the sandspit to the light station. Historic logging, fishing, and homestead sites are also found on the island.

Outer Island (7,999 acres) – Outer Island is the third largest of the Apostle Islands, and the second largest in the lakeshore (6.5 miles long by 2.5 miles wide). Low rock cliffs face the east shoreline, and clay bluffs the west. There are several natural rock landings along the coast, and the south end of the island has a large sandspit that encloses a 1-mile-long lagoon. The island has a large stand of virgin hemlock, a beaver population, and a periodically active bald eagle nest.

A light station complex at the north edge of the island (listed on the National Register) includes a lighthouse and keeper's quarters, a dock, a fog signal/generator building, an oil house, vault toilets, a well, and a small station to monitor acid rain. There are remains of the 1940s Lullaby logging camp on the northeast shore. A 7-mile trail connects the light station with a sandspit and a good sand beach landing at the south end of the island, where there are three designated campsites and a vault toilet. Approximately 2

miles up the trail from the sandspit are the remains of a Schroeder Lumber Company camp (ca. 1928-30), which was apparently the only railroad camp on the islands, and most of the trail is routed along the railroad grade.

Cat Island (1,348 acres) – Cat Island is a low-lying island 3 miles long and 1.25 miles wide. The south end of the island has sandy beaches; the north end, a rocky shoreline. A good sandy beach landing site, two designated campsites, and a capped well are on the south sandspit. A cabin is available for emergency use by area fishermen. A historic logging camp is just north of the cabin. Old logging roads are visible, but there are no maintained trails.

Ironwood Island (659 acres) – Ironwood Island is 1 mile wide and 1.25 miles long. A good sandy beach landing site on the south tip has one designated campsite. Past logging activities damaged the sandspit. There are several old logging roads, but no developed or maintained trails. Backcountry camping is permitted.

Otter Island (1,322 acres) – Otter Island is 2 miles long and 1.25 miles wide. The north and northwest shorelines are lined with rock cliffs, while the other shores are mostly low-lying. There is a natural rock landing on the north side plus a small sandspit on the southeast end. Areas near the rocky cliffs are covered with boreal forest vegetation, and gulls nest on the north side of the island.

A U-shaped dock on the southeast corner provides access to three designated campsites, a well, a vault toilet, and a 1.9-mile trail. Privately owned properties with two unmaintained cabins adjacent to the campsites are managed under use-and-occupancy agreements. A historic 19th century fishing or logging camp and an archeological site are near the trailhead.

South Twin Island (360 acres) – South Twin Island (1 mile long and 0.75 mile wide) is predominantly covered with sand and has no rock formations. A small sandspit is on the west side of the island. South Twin receives heavy use because of the protected waters and the NPS facilities on the west side of the sandspit. Boardwalks connect a dock with a fire ring, a small interpretive center, seasonal staff quarters, and a district ranger residence. A well and vault toilets serve the area, and a 0.25-mile trail leads to an abandoned airstrip. There are five campsites around the perimeter of the area. A fuel supply for NPS boats is stored near the dock.

Rocky Island (1,099 acres) – Rocky Island is about 2 miles by 1 mile. It has a rocky shoreline on the south, sand beaches on the east and northwest, and a sandspit on the southeast. The protected water between Rocky and South Twin islands draws the second highest boater use after Stockton Island. A 1.9-mile trail from the dock on the east side of the island leads to the sandspit and seven campsites along the shore, then across the island to the west beach. Along the trail is the Nies fish camp, which is being interpreted through wayside exhibits. An NPS-owned cabin, well, and vault toilet are near the dock. The Hadland fish camp (listed on the National Register) is north of the dock and is under a use-and-occupancy agreement due to expire in 1999. Other long-term use-and-occupancy agreements limit public access and use of the northern quarter of the island. A bald eagle nest was discovered on the island's northeast tip in 1987.

Devils Island (318 acres) – Devils Island is the northernmost of the Apostle Islands, and it receives the brunt of Lake Superior storms. The constant pounding of waves has created spectacular caves in the rocky sandstone bluffs along the northeast shoreline. These caves are a highlight of excursion boat tours. An active bald eagle nest is on the southeast side of the island.

The historic light station on the north end of the island is served by a natural rock landing site. The complex (listed on the National Register) consists of two lightkeeper's quarters, one of which is used for seasonal NPS staff, a fog signal building used for maintenance functions, a well, a light tower (with its original Fresnel lens), a hoisting engine house, two magazines, and two diesel electrical generators. A 1.2-mile historic road links the light station to a dock and small boathouse on the south end of the island. There is one designated campsite at the south landing. A 0.5-mile trail connects the light station and the east landing, and a second 0.5-mile trail runs from the light station to the west rock landing. Backcountry camping is not permitted.

Islands Reserved for Future Use and Development.

Bear Island (1,824 acres) – The highest point on Bear Island is 250 feet above lake level, the second highest of the Apostle Islands. The island is about 2 miles long and 1.75 miles wide. There is a sandspit on the southeast side, rocky shores with interesting features on the north and east, and clay bluffs on the west. Because of its topography, there are dramatic examples of beachlines formed by earlier Lake Superior water levels. The island contains a virgin stand of hemlock and a bog at the 800-foot elevation.

Public use of Bear Island is currently limited because of existing use-and-occupancy agreements. A 1930s logging camp with remains of log buildings is on the northeast side of the island.

Long Island (300 acres) – Long Island was included in the boundary of Apostle Islands National Lakeshore in 1986 (Public Law 99-497), with the boundary extending 0.25 mile into Lake Superior and Chequamegon Bay. The island is an example of an unspoiled barrier spit, which is quite rare on Lake Superior. The shape and perhaps the geographic position of Long Island changes over relatively short periods of geologic time because of the continuing transportation and redistribution of sand and biomass. A gap between the "island" and Chequamegon Point formed about 1840, 1870, and briefly in 1981. The present sand bridge formed in the mid-1970s. Long Island is now about 4 miles long and from 30 to 200 yards wide.

A modern cylindrical light tower stands at Chequamegon Point, as well as the abandoned historic Chequamegon Point light. The main light tower, which is known as the La Pointe light, stands on the north coast, along with the 1930s keeper's quarters and dock. The ruins of the historic keeper's quarters and an intact oil house are midway between the two lights. All three components are connected by sidewalks, portions of which still exist. There is one tract (36.45 acres) of privately owned land. Long Island probably contains significant prehistoric and historic cultural resources dating to the mid-17th century. The shipwreck *Lucerne* lies within lakeshore boundaries off the north coast.

Long Island's sand and adjacent fishing waters comprise an increasingly important recreational resource for boaters from the nearby ports of Ashland, Washburn, Port Superior, Bayfield, and La Pointe.

Plants and wildlife on Long Island differ considerably from those on the other islands. Ornithologists agree that the island is an outstanding habitat and staging area for sensitive shorebirds, including the endangered piping plover. Long Island is integral to the biologically rich estuarine habitats of the Kakagon Sloughs, the home of the Bad River Band of the Lake Superior Chippewa.

Long Island is the only island in the lakeshore that receives electrical power from the mainland.

Islands with Restricted Use and Access.

Eagle Island (28 acres) – Eagle Island is the westernmost of the Apostle Islands and is about 0.5 mile square. Forested and with a rocky shoreline, it is a primary nesting site for herring gulls and double-crested cormorants, and there is also a great blue heron rookery. Access and approach to the island are restricted during the nesting periods to preclude disturbance by visitors. Access to the island is also dangerous because of submerged boulders and reefs.

Gull Island (3 acres) – Gull Island is a low island that is the visible end of a reef extending northeastward from Michigan Island; it is about 200 yards long and 20 yards wide. The island consists of pebbles and boulders and is sparsely covered with grasses and shrubs. An automatic navigation light warns boaters about nearby reefs. Visitation is restricted because this is one of the primary nesting sites of the herring gull and double-crested cormorant. Boaters may not approach the island during the nesting period, from late May through September.

North Twin Island (175 acres) – Remote North Twin Island is the smallest (1 mile by 0.25 mile) of the forested islands, with a good example of a relatively undisturbed boreal forest. The shoreline is nearly all rocky, with a natural rock landing site on the northwest corner. Bald eagles have nested on the island in recent years. A cabin near the landing site is used to house biological researchers. Camping, hunting, and other recreational uses are restricted.

Carrying Capacity

Carrying capacity is a concept that is being used by professionals in various disciplines to help quantify how much use a given unit of land can support. The goal is to identify a level of use that is within management policies and objectives and that will prevent the resource from suffering degradation due to overuse.

Four types of carrying capacity can be applied to recreational settings: physical, ecological, social, and facility (Shelby and Heberlein 1986). Any one or any combination of these capacities may be applied to a recreation area at a given time. The selection of a capacity measurement scheme for an area depends on specific conditions within the park, on the availability or accessibility of baseline data, and on management policies and objectives. In addition, different measurements of capacity may be applied to separate areas within a facility.

> *Physical capacity* involves the number of recreationists that can physically fit into an area. Measurement parameters for this capacity are usually expressed in terms of the number of people per unit of space (for example, per acre or square foot).
>
> *Ecological capacity* is concerned with impacts on the natural environment. Ecological carrying capacity is determined in consideration of the impacts that recreational use could have on animals, plants, soils, water, air, and other elements of the ecosystem. When necessary, this capacity might also be extended to encompass impacts on cultural resources. The capacity might then be termed "resource capacity."

Social capacity refers to the number of people that can be in an area without altering or impairing recreational experiences. Measurements of impact are largely based on the number of encounters with other recreationists, and on the effect of these encounters on the overall enjoyment of the park and activities.

Facility capacity involves improvements that are intended to satisfy the needs of park visitors. Facility capacity is indicated by the number of people that can be accommodated by improvements such as parking lots, restrooms, boat ramps, and campgrounds.

In considering the available baseline data, it was decided that at the present time facility capacity would provide the most accurate estimate of a carrying capacity for Apostle Islands National Lakeshore. As more baseline data are collected on the resources and use patterns of the lakeshore, social and resource capacities will be established. These capacities will then take precedence over facility capacity in determining the maximum level of permissible use.

The number of visitors at a given time within the lakeshore is strongly affected by the size of existing and proposed facilities and programs. The carrying capacity of the lakeshore is established by the most constraining or limiting of these facilities. At Apostle Island, three facilities provide the ultimate constraints on visitor use. Use on the mainland is regulated by the number of automobile parking spaces, while island use is largely controlled by the number of boat slips at nearby marinas and by tour boat capacities. Parking/docking facilities and tour boat capacities are an excellent indication of the possible magnitude of the lakeshore's carrying capacity. Changes in the facilities can also be used to predict the effects of the proposed alternatives on the carrying capacity of the islands. To display how the various alternatives could potentially affect the carrying capacity, tables for each alternative summarize the possible capacities for both the mainland and the islands. A complete discussion of the methodology used to determine facility carrying capacities for the lakeshore is included in appendix I.

Facility carrying capacities for Apostle Islands are intended only as a guide. A carrying capacity model should also incorporate expressions of current and predicted environmental impacts caused by visitor use, as well as statistics on the nature, volume, and distribution of recreational use within the lakeshore. In order to develop a more thorough understanding of such considerations (and to make more effective use of the carrying capacity concept), the following actions need to be accomplished by lakeshore staff:

Review and refine the capacities presented in the general management plan.
Establish field sampling points to observe and measure visitor impacts on the ecosystem, on facilities, and on recreational activity patterns.

When feasible, conduct a visitor survey to determine use patterns (including turnover rates, average length of stay, intrapark travel patterns, and areas of concentrated use).

Utilize visitor information systems in adjusting future use volumes.

The estimated annual facility capacity for alternative A is shown in table 2.

Table 2: Annual Facility Carrying Capacity – Alternative A

	Recreation Visits
Islands	
Private Boats*	211,000
Tour Boats	28,000
Subtotal	239,000
Mainland	
Bayfield Headquarters	249,000
Little Sand Bay	19,000
Subtotal	268,000
Total Facility Capacity	**507,000**

* Private boats include privately owned craft, charter boats, and water taxi service.

As shown in table 2, the total facility capacity for Apostle Islands under existing conditions is approximately 507,000 visitors. About 53 percent of this total (268,000 visitors) is attributable to the mainland, while the remainder is associated with the islands. Recreation visits to Apostle Islands totaled approximately 138,000 in 1987 (the peak year for visitation thus far). Therefore, current lakeshore use is about 27 percent of total facility capacity.

BOUNDARY MODIFICATIONS AND LAND ACQUISITION

No changes to the existing boundary and landownership would be proposed under alternative A. However, the National Park Service would continue to pursue every opportunity to acquire outstanding nonfederal mineral rights as they become available, as well as the 36.45 acres of private land on Long Island.

LAKESHORE OPERATIONS

Existing operations would continue under this alternative, with administrative and maintenance functions in Bayfield and a district ranger operation in Little Sand Bay. Seasonal staff would continue to be stationed on Stockton, Oak, Manitou, Raspberry, Sand, South Twin, Devils, Outer, Rocky, and Michigan islands. Staffing levels would vary at each site, depending on visitor services and resource protection needs. Staffed locations would be subject to change based on operating needs.

ALTERNATIVE B – PRIMITIVE EMPHASIS

Under alternative B the primary elements of the visitor experience would be solitude, remoteness, and self-reliance, and most of the islands would be managed to enhance these values. Only those facilities needed for resource protection, including some docks, designated campsites, sanitary facilities, and trails, would be provided on the islands. Docks would be used at sites where beach landings cause severe damage (vegetation loss and erosion) to sandspits and beaches. Designated campsites and trails would focus and channel use through or away from sites especially sensitive to trampling. Sanitary facilities would be used where there might be a problem of water contamination or where frequent use might result in resource degradation. Few facilities would be provided solely for visitor convenience.

Selected islands would be accessible to visitors by means of a concessioner-operated tour boat. Most islands would also be accessible by water taxi or privately owned watercraft. The islands accessible by tour boat would have some interpretive facilities, trails, and campsites, which would give those visitors who do not seek a primitive experience the opportunity to get a firsthand understanding of the Apostle Islands. The presence of facilities and personnel on some islands could result in a slightly more structured experience than on the undeveloped islands, yet the overall visitor experience would still be one of remoteness and self-reliance. Interpretation would be important not only in telling the park story, but in promoting visitor understanding and support for management actions necessary for resource protection.

Visitors who could not visit the islands would have the opportunity to learn about them through interpretive programs at the Bayfield visitor center, which would include exhibits, audiovisual programs, publications, and personal services. Space limitations at the Bayfield visitor center preclude extensive interpretation of the park story, but the intent would be to give visitors a sense of the Apostle Islands as a remote and unique environment. Interpretation would focus on the natural processes that have created and are continuing to shape the islands, and the varying degrees to which humans have affected and have been affected by the islands. Publications for visitors whose primary contact with the lakeshore is only by boat would be available at the Little Sand Bay visitor contact station and local marinas.

MANAGEMENT ZONING

The only change in management zoning from existing conditions would be in the natural zone. A primitive environment subzone would be established to protect undeveloped lands of primitive character and with no permanent improvements or human habitation. These lands would be managed to preserve their wilderness character. Islands in this subzone would include Cat, Ironwood, and York islands, and parts of Raspberry, Devils, Michigan, Stockton, and Outer islands. Total acres placed in this subzone would be 20,357 (see table 3).

Table 3: Management Zoning – Alternative B

Zone/Subzone	Acres	Percentage of Lakeshore
Natural Zone		
Outstanding natural feature subzone	2,825	4.1
Protected natural area subzone	300	0.4
Primitive environment subzone	19,924	28.7
Natural environment subzone	17,962	25.9
Subtotal	41,011	59.1
Historic Zone	370	0.5
Park Development Zone	238	0.3
Special Use Zone		
State-owned (submerged lands) subzone	27,232	39.3
Reservation of use subzone	206	0.3
Inholdings (federal, local, and private) subzone	315	0.5
Subtotal	27,753	40.1
Total	**69,372**	**100.0**

RESOURCE MANAGEMENT

Natural Resources

In general, the long-term natural resource management objective of the National Park Service is to restore and maintain the biologic diversity of the dynamic ecosystem that would exist today had not human activities such as logging intervened. The significance of lakeshore resources in terms of the biologic diversity of the fragmented natural ecosystem of the western Great Lakes area is currently under study.

The immediate management objective for natural resources will be to ensure their protection and preservation, in accordance with the approved *Resources Management Plan and Environmental Assessment* (NPS 1986). As described under alternative A, a limited regeneration program will be implemented for selected vegetative types, in lieu of large-scale reforestation efforts. Fire will be used as a tool in the management of forest vegetation and wildlife. The use of sandspits will be monitored, and protective actions will be taken wherever use is destroying or causing drastic changes in the composition of beach grasses. Management plans will be prepared for species that can be hunted and trapped, and the feasibility and desirability of reestablishing species that have been extirpated from this region will be determined on a species-by-species basis.

The National Park Service will cooperatively manage the lakeshore's fishery resources, particularly the spawning reefs and shoals within the lakeshore boundaries (0.25 mile out from each island). An in-house water monitoring schedule will be established to ensure that the highest water quality standards are maintained. Because the temporary wet-fall air quality monitoring site on Outer Island has been removed, the establishment of a permanent air quality monitoring site in the lakeshore is being considered.

To determine whether the lakeshore's natural resources are being adversely affected by visitor use, a long-term monitoring program would be established. Based on monitoring

results and evaluation standards, managers would establish the resource carrying capacity for a particular site. Particular areas where carrying capacities might have to be established include the sandspits on Raspberry, Oak, Rocky, Outer, and Michigan islands.

Cultural Resources

Under alternative B the National Park Service and the state of Wisconsin would develop an agreement to manage and protect known submerged cultural resources within the lakeshore. This agreement would be written to include additional resources as they were identified. When funded, an underwater resource study would be undertaken in phases, with appropriate submerged cultural resources being inventoried and site reports being prepared. Submerged cultural resources would be located, identified, evaluated, preserved, managed, and interpreted in such a way that they would be preserved unimpaired for future generations. They would be managed as historic zones. Positive actions would be taken to prevent adverse effects on these resources as a result of development, visitor use, or resource management activities; and vandalism or unauthorized excavation, collection, or appropriation of cultural resources would be prohibited.

The light stations are under the jurisdiction of the U.S. Coast Guard, and they are managed by the National Park Service under a number of different arrangements with the U.S. Coast Guard. If they were turned over to the Park Service, they would be managed to ensure their preservation. NPS staff would monitor the structures to determine the cause of any damage, mitigate any known damage, restore them when appropriate, or possibly modify them for adaptive use.

The lakeshore's *Resources Management Plan and Environmental Assessment* describes in greater detail the program for identifying, protecting, and interpreting cultural resources, and it provides an array of alternatives for addressing these problems. National Register properties would be preserved to prevent deterioration. All other sites would be preserved and interpreted according to their significance.

Under alternative B a special history study on the role and function of the lakeshore's light stations in Great Lakes navigation history would be completed to guide interpretation and preservation. This study would further define those structural elements of the light stations that are of historical significance and would result in the updating of National Register forms for these sites.

ACCESS AND CIRCULATION

Land Access

The National Park Service would attempt to gain authority to improve the Meyers Road lake access (3.3 acres) on the mainland and to construct a small parking area to accommodate existing use at this site. This area provides an excellent entrance to the lakeshore for visitors arriving from the west on Wisconsin Highway 13. Options to use federal funds to improve and maintain nonfederally owned lands are discussed in appendix F.

Water Access

A concessioner would continue to provide a tour boat service among the islands, with stops at Stockton, Manitou, and Raspberry islands. Tours would provide opportunities for interpretive programs about the islands and short hikes. Campers would also have access to these islands by means of the tour boat, the water taxi service, or privately owned watercraft. Access to the other islands would be by water taxi or privately owned watercraft. The only commercial uses permitted under this alternative would be those activities that recognized the islands' primitive character.

VISITOR USE AND INTERPRETATION

Mainland

Visitor facilities and interpretive programs on the mainland would remain essentially the same as now. Visitors going to Little Sand Bay would be able to visit the Hokenson Brothers Fishery and the visitor contact station. They would also have access to Russell Township facilities (see Mainland – Bayfield Peninsula map).

The visitor center in Bayfield and the visitor contact station in Little Sand Bay would provide the only opportunities for visitors not getting out to the islands to learn about the lakeshore. Existing programs would be modified, or additional audiovisual materials would be provided, including an aerial perspective of the islands.

Islands with Structured Use and Tour Boat Access; Some Facility Development

This group of islands would not be strictly managed for a primitive experience. Instead, easy access and the presence of some visitor facilities would allow visitors to experience a sense of isolation and self-reliance without needing to provide their own transportation. The concession tour boat service would provide access to Raspberry, Manitou, and Stockton islands (see Park General map). Interpretive programs on these islands would consist primarily of on-site exhibits and publications to give visitors an understanding of the natural and cultural history of the lakeshore. Personal services at selected sites would be available during peak visitation periods. Management of the islands would remain essentially the same as now, with the following exceptions.

Raspberry Island. To protect the fragile sandspit on the southeast end of the island, the existing campsites would be removed and the island would be designated for day use only. A historic structure report and a historic furnishings study would be done to determine the condition and structural capacity of the light station and the feasibility of refurnishing parts of the light station to the 1920s period. These studies would provide the necessary information and direction for further restoration efforts.

Manitou Island. Sociological and resource carrying capacities would be established for Manitou Island. Additional publications would be developed for its interpretation.

Stockton Island. A boardwalk or other appropriate system would be installed at the Quarry Bay group campground to channel use and protect the fragile beach vegetation. The natural and cultural history of the island, such as the Trout Point logging camp and the shipwreck *Noquebay*, would be interpreted through wayside exhibits, publications, or guided walks. The visitor contact station at Presque Isle would have permanent interpretive exhibits.

Islands with Independent Use and Access; Little Facility Development

Proposals for islands where visitors would arrive by their own means are described below.

Sand Island. The exterior of the lighthouse would be rehabilitated and preserved to maintain the historical appearance. The interior would be stabilized to prevent deterioration. Interpretation would be by means of wayside exhibits or publications.

York Island. Campsites along the sandy north beach would be retained, but no toilet facilities or well would be provided.

Oak Island. Forest history and logging would be interpreted. Additional campsites would be added after a demonstrated need arose and thorough impact studies had been conducted.

Hermit Island. Visitors would still be able to see the quarry, the Cedar Bark Lodge site, and a historic farmstead on their own.

Basswood Island. A self-guiding interpretive trail would be constructed through the quarry site. The historic landscape of the quarry and the McCloud-Brigham farm, including the remnant orchard, would be documented, and natural vegetation would be allowed to reclaim these sites. Interpretive exhibits would be placed at the farmstead to tell the story of island farming and the process of natural revegetation.

Michigan Island. The exterior of the light station on Michigan Island would be rehabilitated and preserved as part of the historical scene, and the interior would be stabilized to prevent deterioration.

Outer Island. The light station on Outer Island would be rehabilitated and preserved, and the interior would be stabilized to prevent deterioration. The historic site would be interpreted through exhibits and publications.

Ironwood and Cat Islands. Both Ironwood and Cat islands provide good opportunities for solitude. The sandy beaches provide suitable landing sites for hand-powered craft, such as kayaks.

Otter Island. A study would be conducted to determine if the existing dock is altering the configuration of the sandspit, and to recommend whether the dock should be modified or removed.

South Twin Island. Because tour boat visitor use would be focused on Stockton, Manitou, and Raspberry islands, the visitor contact station, seasonal quarters, and district ranger quarters on South Twin Island would be removed. The anchorage between South Twin and Rocky islands would continue to be used as an overnight mooring area by sailboaters.

Devils Island. The light station on Devils Island would be rehabilitated and preserved to help recreate a historical scene. The interior would be stabilized to prevent deterioration The site would be interpreted through exhibits and publications.

Islands Reserved for Future Use and Development

Bear and Long islands have good potential for visitor use. However, the most desirable locations for a dock and other visitor activities on Bear Island are under life estates and use-and-occupancy agreements. When these agreements expire and resource studies have been completed, visitor use proposals would be considered. Long Island is a new addition to the lakeshore, and no visitor use proposals would be considered until ongoing basic resource inventories have fully evaluated the natural and cultural resources.

Islands with Restricted Use and Access

Public use of North Twin, Gull, and Eagle islands would continue to be restricted because of the sensitivity of the resources and the unique opportunity for scientific studies.

Carrying Capacity

The estimated annual facility capacity for alternative B is shown in table 4. Proposed facility modifications that have been incorporated into these estimates include the addition of parking spaces at Meyers Road and changes in tour boat schedules and capacities.

Total lakeshore capacity would be approximately 3 percent higher under this alternative as compared to existing conditions. The total capacity of the islands would be 4 percent less than under existing conditions, while the capacity of the mainland would be about 9 percent higher. (A table that compares the capacities of each alternative is included in appendix I.) Peak year visitation (138,000) would be equivalent to 26 percent of total capacity under this alternative.

Table 4: Annual Facility Carrying Capacity – Alternative B

	Recreation Visits
Islands	
Private Boats*	211,000
Tour Boats	19,000
Subtotal	230,000
Mainland	
Bayfield Headquarters	249,000
Little Sand Bay	19,000
Meyers Road	25,000
Subtotal	293,000
Total Facility Capacity	**523,000**

* Private boats include privately owned craft, charter boats, and water taxi service.

BOUNDARY MODIFICATIONS AND LAND ACQUISITION

Under this alternative no boundary adjustments would be proposed. An interest in the Meyers Road corridor would be acquired (see appendix F), which would allow this area to be developed as an entrance point for visitors arriving from the west on Wisconsin 13. The National Park Service would also pursue every opportunity to acquire outstanding

nonfederal mineral rights as they become available, as well as the 36.45 acres of privately owned land on Long Island.

LAKESHORE OPERATIONS

The lakeshore's administrative and maintenance functions would remain in the vicinity of Bayfield. A district ranger operation would remain in Little Sand Bay. Resident seasonal staff necessary for basic park services and protection would be stationed as needed on Stockton, Manitou, Rocky, Oak, and Raspberry islands. Any other required housing would be located at Little Sand Bay. Staffed locations would be subject to change based on revised operating needs. Staffing levels would vary at each site depending on visitor services and resource protection needs.

ALTERNATIVE C – ISLAND EMPHASIS

Under alternative C Apostle Islands National Lakeshore would be managed to encourage visitors to spend time on the islands and to have the opportunity to learn firsthand how unique and isolated the islands are, and how extensively the resources have been used by people. Visitors could see and experience for themselves the unique natural resources that attracted people, the changes due to human use, and the subsequent slow recovery process. Visitors would have the opportunity to experience the beauty and tranquillity of the islands as well as the awesome power of Lake Superior.

Bayfield and Little Sand Bay would serve as thresholds for visits to the islands. Convenient and affordable transportation would be available so that visitors without private boats would be assured of opportunities to spend time on the islands. The National Park Service would provide visitor facilities for both day and overnight use on selected islands. Other islands would remain undeveloped except for facilities needed for resource protection. These islands would be available to visitors who have their own means of access and who seek a more challenging experience.

MANAGEMENT ZONING

As described under alternative B, a primitive environment subzone would be added to the natural zone and would include York, Cat, and Ironwood islands and parts of Michigan and Devils islands. If acquired from the state, submerged lands except for shipwrecks would be put in the natural environment subzone; shipwrecks would be placed in the historic zone. If the Little Sand Bay road corridor was acquired through a boundary adjustment, it would be placed in the development zone.

Table 5: Management Zoning – Alternative C

Zone/Subzone	Acres	Percentage of Lakeshore
Natural Zone		
Outstanding natural feature subzone	2,825	4.1
Protected natural area subzone	300	0.4
Primitive environment subzone	4,206	6.0
Natural environment subzone	60,890	87.8
Subtotal	68,221	98.3
Historic Zone	372	0.5
Park Development Zone	258 (20)*	0.4
Special Use Zone		
Reservation of use subzone	206	0.3
Inholdings (federal, local, and private) subzone	315	0.5
Subtotal	521	0.8
Total	**69,372 (20)***	**100.0**

*Acreage in parentheses denotes land that is outside the boundary; if acquired, this acreage would be added to the total lakeshore acreage.

RESOURCE MANAGEMENT

Natural Resources

In general, the long-term natural resource management objective of the National Park Service is to restore and maintain the biologic diversity of the dynamic ecosystem that would exist today if human activities such as logging had not intervened. The significance of lakeshore resources in terms of the biologic diversity of the fragmented natural ecosystem of the western Great Lakes area is currently under study.

The primary management objective for natural resources would be to ensure their protection and preservation, in accordance with the approved *Resources Management Plan and Environmental Assessment* (NPS 1986). As described under alternative A, a limited regeneration program will be implemented for selected vegetative types, in lieu of large-scale reforestation efforts. Prescribed fire may be used as a tool in the management of forest vegetation and wildlife.

To determine whether the lakeshore's natural resources are being adversely affected by visitor use, a long-term monitoring program will be established. Based on monitoring results and evaluation standards, managers will establish the resource carrying capacity for a particular site. Specific areas where carrying capacities might have to be established include the sandspits on Raspberry, Oak, Rocky, Outer, and Michigan islands.

Management plans will be prepared for wildlife species, and the feasibility and desirability of reestablishing species that have been extirpated from this region will be determined on a species-by-species basis.

The National Park Service will cooperatively manage the lakeshore's fishery resources, particularly the spawning reefs and shoals within the lakeshore boundaries (0.25 mile out from each island). An in-house water monitoring schedule will be established to ensure that the highest water quality standards are maintained. The temporary wet-fall monitoring site on Outer Island has been removed, and the establishment of a permanent air quality monitoring site is being considered.

Cultural Resources

The National Park Service would seek to acquire from the state of Wisconsin all lake bottom lands within the 0.25 mile boundary around each island. Preliminary contacts indicate that the state would be willing to discuss this matter. An important concern of the Wisconsin Department of Natural Resources is to retain management control of the fisheries. Formal transfer of the land would require action by the Wisconsin Legislature.

If acquired by the National Park Service, all submerged cultural resources within this area would be managed in accordance with NPS policy, which requires intensive archeological survey coverage and evaluation of areas where lakeshore development (such as dock construction) would occur and where no previous archeological surveys have been completed. The park would test and evaluate sites that have already been inventoried, beginning with sites subject to natural threats or located in areas visited by the diving public. Nomination forms to the National Register of Historic Places would be prepared for appropriate sites. A survey would be conducted of other areas with high potential for resources, including ancient beaches and sites where historical records

indicate potential subsurface remains. The Park Service would perform appropriate mitigation and salvage work as threats to significant sites were identified.

As described under alternative B, an underwater resource study would be conducted, and steps would be taken to prevent any adverse effects because of development, visitor use, or resource management activities. The Park Service would continue to manage the historic light stations under agreements with the U.S. Coast Guard. A special history study would be conducted about the role and function of the Apostle Islands light stations to guide interpretation and preservation efforts. Management actions under this alternative would include the interpretation and maintenance of historical landscapes, the interpretation and rehabilitation or stabilization of historic structures, and the interpretation of historic sites.

ACCESS AND CIRCULATION

Land Access

Under this alternative the National Park Service would attempt to gain authority to improve and maintain the road into Little Sand Bay (17.5 acres). As shown on the Mainland – Bayfield Peninsula map, the road would be slightly realigned and paved to provide easier access for visitors. (Options for using federal funds for road improvements are discussed in appendix F.)

Water Access

To make the lakeshore available to all visitors, regardless of their economic situation, tour boat access would be provided to Sand, Raspberry, Oak, Manitou, Basswood, Stockton, and Outer islands. Tour boats would also pass by Hermit and Devils islands and Squaw Bay on the mainland. These islands have especially interesting resources, and together they offer a comprehensive sampling of lakeshore resources. To provide interpretive information, an NPS interpreter could accompany selected tours, or concession boat operators could be trained in interpretive techniques. Tours would be designed to allow visitors to spend a few hours on an island or to stay overnight. To ensure convenient and affordable access to the islands, it may become necessary for the federal government to subsidize transportation systems. (Options for how a transportation system could be subsidized are discussed in appendix C.)

Tour boats would operate from both Bayfield and Little Sand Bay. To improve the financial feasibility, the concessioner would also be permitted to rent camping equipment and simple camping shelters to visitors and also to operate a boat-fueling facility and a small campstore. These services would give visitors who were not fully equipped a chance to stay overnight on the islands. Besides tour boats, a water taxi service would continue to be offered.

Through concession contracts or commercial use licenses, the National Park Service would encourage guided trips to the islands for both summer and winter activities. In winters when Lake Superior ice conditions are suitable, guided tours could be offered to special scenic features such as ice formations in the caves at Squaw Bay.

VISITOR USE AND INTERPRETATION

Mainland

NPS facilities at Little Sand Bay and Bayfield would orient visitors to the islands, where the visitor experience would be focused.

Little Sand Bay. A new visitor contact station would replace the existing facility at Little Sand Bay. The station would have public restrooms, interpretive exhibit space, an information desk, cooperating association sales space, administrative office space, and additional parking for about 15 to 20 cars (see Mainland – Bayfield Peninsula map). The facility would be designed to function with or without staffing. Interpretation would provide an overview of the islands – how they were formed, their natural history and human use, and how they relate to the mainland. Self-guided interpretive loop trails would be constructed to the Hokenson Brothers Fishery and the Little Sand Bay bog.

Bayfield. Interpretation would continue to be provided at the Bayfield visitor center in the courthouse. This visitor center would not be expanded because of space limitations, but comprehensive interpretation of the islands would be provided through exhibits, films, and personal interpretation. Extensive interpretation would be available at various sites on the islands.

Information Stations. Information kiosks would be placed at the marinas in Ashland, Washburn, Port Superior, Bayfield, Cornucopia, Madeline Island, and Red Cliff. If feasible, the National Park Service would cooperate with local communities and agencies in the development of an information center at the junction of US 2 and Wisconsin 13.

Islands with Structured Use and Tour Boat Access; Some Facility Development

Sand, Raspberry, Oak, Manitou, Basswood, Stockton, and Outer islands would be accessible by tour boat, as well as by private boats and water taxi (see Park General map). Proposed development would be for both resource protection and visitor convenience. The goal of interpretation would be to weave together the stories associated with each island into a comprehensive picture of the lakeshore. Mooring buoys could be used at Stockton, Raspberry, and South Twin/Rocky islands as a means of managing overnight sailboat use when these areas become too congested. Specific proposals for each island are discussed below.

Sand Island. To provide easier access to the Sand Island light station, a new dock would be constructed in Lighthouse Bay, and a trail would be built from the dock to the light station. The exterior would be restored. The existing trail from the light station to the campground crosses some low wet areas, so the surface would be hardened to protect the resource. The trail would be realigned to pass by the Noring farm clearing and the 240-year-old white pine stand. Interpretive topics would include the farmstead, the white pines, and the light station, and both wayside exhibits and a self-guiding trail leaflet would be used to present interpretive messages.

The campground at East Bay would be expanded to about 10 sites, and concessioner-managed camping shelters would be provided. A ranger residence, which is now 0.5 mile from the dock and campground, would be relocated closer to the dock and campground to allow for more efficient visitor contact, protection, and interpretation.

When the use-and-occupancy reservations and life estates expire, a dock would be provided in West Bay, the trail system would be expanded to include the National Register properties, and more campsites would be provided. Adaptive use of the West Bay Club building for overnight lodging would be considered. Selected existing structures in potential historic districts would be evaluated for adaptive uses such as an environmental education center, volunteers-in-parks quarters, and a youth hostel.

Raspberry Island. The campsites on the sandspit would be removed because of severe resource damage from camping, and the island would be designated for day use only. To interpret the virgin forest, a loop trail would be developed from the light station. A historic structure report and a historic furnishings study would be done to determine the condition and structural capacity of the light station and the feasibility of refurnishing parts of it to the 1920s. These studies would provide the necessary information and direction for further restoration efforts. Interpretation of the light station would continue.

Oak Island. Additional campgrounds would be developed on Oak Island, with sites determined by a future site-specific plan. The post-glacial beachlines, forest succession, and logging history would be interpreted through wayside exhibits and publications. The trail system would be extended to include the Schroeder Lumber Company camp 5. The vegetation at the logging camp would be managed to maintain the historic landscape.

Manitou Island. If a suitable site could be found, a few additional campsites would be developed on Manitou Island. An interpretive loop trail would connect the campsites and dock with the fish camp and an archeological site on the southeast side of the island. Personal interpretation of the fish camp would continue, and a self-guiding trail leaflet would be developed. New employee quarters would be constructed out of sight of the restored fish camp and visitors. The historic cabin now being adaptively used as quarters would be returned to its original appearance and would continue to be interpreted.

Basswood Island. A dock for visitors as well as concession tour boats would be constructed near the quarry on Basswood Island. The historic landscape of the quarry area and the McCloud-Brigham farmstead, including the remnant orchard, would be maintained, which would require tree and shrub removal and seasonal vegetation clearance. A self-guiding interpretive trail would be constructed through the quarry site. The quarry and farmstead would be interpreted through wayside exhibits and publications. A new campground would be developed at the north dock, and the campsites on the southern and western sides of the island would be retained. Camping shelters managed by the concessioner would be provided. A loop trail would connect the quarry, farmstead, docks, and camping areas. The trails would be designed to accommodate skiing and snowshoeing, as well as hiking. Winter camping and guided ski/snowshoe trips under commercial use permits would be encouraged.

Stockton Island. A footbridge would be constructed across the inlet at Quarry Bay for hiker access to Presque Isle. A loop trail connecting Quarry Bay, Presque Isle, and Trout Point would be constructed. The quarry would be cleared so it could be seen from the trail, and a loop through the site would be added. The Trout Point logging camp would be interpreted.

A wayside exhibit at Julian Bay would interpret the shipwreck *Noquebay*, and a map of the wreck would be prepared for divers and snorkelers with valid permits to visit the site. A management plan for the shipwreck would be developed to guide public use, and the park would continue an energetic public education campaign about the importance of not removing artifacts. The site would be monitored for artifact loss. If any such loss endangered the site's integrity, the park would discontinue issuing diving permits.

The campground sites at Quarry Bay would be clearly defined. A boardwalk or other system would be installed to channel use and protect the fragile sand beach vegetation. The visitor contact station at Presque Isle would have permanent interpretive exhibits in place.

Outer Island. If feasible, the area around the dock at Outer Island would be dredged to allow deeper draft boats to dock. The light station would be adaptively used as employee housing. A new interpretive trail would be constructed to the unique hemlock stand near the light station, and a loop trail would be developed to link the light station, Lullaby logging camp, Schroeder Lumber Company logging camp, and the logging railroad landing at the southern end of the island. The historic scene at the Schroeder logging camp would be maintained. The Lullaby logging camp is interesting because of the many artifacts on the site. Interpretation would be through wayside exhibits, publications, and possibly guided tours. Campsites and concession-managed camping shelters would be developed at both the north and south ends of the island. At the south end, care would be taken to locate the camping area away from the fragile sandspit.

Islands with Independent Use and Access; Little Facility Development

This group of islands would serve those visitors who have their own means of transportation and who seek a more challenging and remote experience. Most facilities would be for resource protection rather than visitor convenience. Included in this group of islands would be York, Hermit, Michigan, Ironwood, Cat, Otter, Devils, and Rocky islands (see Park General map). Specific proposals for each island are described below.

York Island. This island provides an excellent recreational opportunity for visitors with hand-powered watercraft, such as kayaks. One or two small additional campsites would be designated along the north beach. No camping would be allowed on the fragile sandspit, and no docking facilities would be provided.

Hermit Island. The primary landing and trailhead would be the sand beach on the north shore. Campsites would be developed near this landing and in an area on the western coast. A trail would connect the beach landing, quarry, Wilson's cabin site, Cedar Bark Lodge site, the rocky coast northwest of the gull colony, and the campsites. Interpretation would be provided through wayside exhibits or publications.

Michigan Island. A trail from the Michigan Island light station to the sandspit would be constructed. The campsites on the sandspit would be relocated to a less sensitive site, and a boardwalk or other system would be installed to channel use and protect the sensitive beach vegetation. The exterior of the light station would be rehabilitated and preserved, and the interior would be stabilized to prevent deterioration. A cultural landscape report would be completed for the light station, and a plan would be developed to maintain the historical landscape. Interpretation would be through signs or publications focusing on both the light station and resource protection measures.

Otter Island. A study would be conducted to determine if the dock is altering the configuration of the sandspit and to recommend whether it should be modified, relocated, or removed. About five campsites would be developed on the northeast corner of the island.

Ironwood and Cat Islands. These islands offer good opportunities for visitors who enjoy the challenge of using hand-powered watercraft, such as kayaks. Sandy beaches on both islands provide suitable landing sites.

Devils Island. The exterior of the light station would be rehabilitated and preserved to help recreate a historical scene, and the interior would be stabilized to prevent deterioration. A cultural landscape report would be completed to guide maintenance and interpretation of the landscaping at the light station. Interpretation would be through exhibits and publications. The tour boat would pass by Devils Island so visitors could see the spectacular rock caves that have been carved by Lake Superior.

Rocky Island. Existing access would continue on Rocky Island. When use and occupancy agreements terminate, the trail system would be expanded to include such interpretive sites as the Hadland fish camp.

Islands Reserved for Future Use and Development

Bear and Long islands have good potential for visitor use. However, the most desirable locations for a dock and other visitor activities on Bear Island are under life estates and use-and-occupancy agreements. When these agreements expire and resource studies have been completed, visitor use proposals would be considered. Long Island is a new addition to the lakeshore, and no visitor use proposals would be considered until basic resource inventories have evaluated the natural and cultural resources.

Islands with Restricted Use and Access

Public use of North Twin, Gull, and Eagle islands would continue to be restricted because of the sensitivity of the resources and the unique opportunity for scientific studies.

Carrying Capacity

The estimated annual facility capacity for alternative C is shown in table 6. Proposed facility modifications that have been incorporated into these estimates include the addition of parking spaces at Little Sand Bay and changes in tour boat schedules, routes, and capacities.

Total park capacity would be approximately 8 percent higher under this alternative as compared to existing conditions. The capacity of the islands would be 6.6 percent higher than under existing conditions, while the capacity of the mainland would be about 9 percent higher. (A table comparing the capacities of each alternative is included in appendix I.) Peak year visitation (138,000) would be equivalent to 25 percent of total capacity under this alternative.

Table 6: Annual Facility Carrying Capacity – Alternative C

Islands	Recreation Visits
Private Boats*	211,000
Tour Boats	44,000
Subtotal	255,000
Mainland	
Bayfield Headquarters	249,000
Little Sand Bay	44,000
Subtotal	293,000
Total Facility Capacity	**548,000**

* Private boats include privately owned craft, charter boats, and water taxi service.

BOUNDARY MODIFICATIONS AND LAND ACQUISITION

The National Park Service would attempt to acquire rights to the Little Sand Bay road corridor to improve access to Little Sand Bay. Acquisition could be accomplished through a boundary adjustment or some other means (see appendix F).

The National Park Service would also pursue every opportunity to acquire outstanding nonfederal mineral rights as they become available, as well as the 36.45 acres on Long Island that are privately owned.

LAKESHORE OPERATIONS

Maintenance operations would be focused in the Bayfield vicinity. Lakeshore headquarters and the visitor center would remain in leased space in the old Bayfield County courthouse, and a district ranger station would continue at the new visitor contact station in Little Sand Bay. Seasonal staff for maintenance, interpretation, and protection would be stationed on Stockton, Raspberry, Outer, Sand, Michigan, and Oak islands. Staffed locations would be subject to change based on revised operating needs. Staffing levels would vary at each site depending on visitor services and resource protection needs.

ALTERNATIVE D – MAINLAND EMPHASIS

Under alternative D the mainland unit of Apostle Islands National Lakeshore would be managed to emphasize overnight and recreational use, the islands would be primarily managed for use during the day. Opportunities on the mainland would include various interpretive activities, camping, hiking, boating, snowshoeing, cross-country skiing, fishing, and sight-seeing. Most visitors would see the islands from the shore and perhaps sense them as formidable, mysterious, and romantic.

Convenient and affordable transportation would be available so that visitors without private boats would be assured of opportunities to visit some islands. Visitors who did spend a little time on various islands could see and appreciate the natural resources that first attracted people. Logging camps, quarries, farmsteads, and fishing camps all show how people have used the resources to their advantage, while light stations and shipwrecks show that people also had to be wary of natural forces. Most visitors would not stay overnight on the islands, and therefore they would only have a limited sense of just how isolated and remote the islands are. Those visitors with privately owned watercraft or who took advantage of the water taxi service would be able to stay on the islands as long as they wanted (subject to limited camping facilities and length-of-stay policies) and to experience firsthand the remoteness and solitude.

MANAGEMENT ZONING

Management zoning would be similar to existing conditions except a primitive environment subzone would be established as described under alternative B and would include York, Cat, and Ironwood islands and parts of Raspberry, Devils, Michigan, and Outer islands. The proposed Meyers Road and Sand Point Road developed areas would be placed in the development zone. If the Little Sand Bay and the Sand Point/Berwager road corridors were acquired through a boundary adjustment, they would be placed in the development zone. If the Schumacher, Bayfield County, and Berwager properties were acquired through a boundary adjustment, they would be added to the natural zone. If submerged cultural resources were acquired from the state, they would be placed in the historic zone (see table 7).

RESOURCE MANAGEMENT

Natural Resources

In general, the long-term natural resource management objective of the National Park Service is to restore and maintain the biologic diversity of the dynamic ecosystem that would exist today if human activities such as logging had not intervened. The significance of lakeshore resources in terms of the biologic diversity of the fragmented natural ecosystem of the western Great Lakes area is currently under study. Natural resources will be managed to ensure their protection and preservation, in accordance with the approved *Resources Management Plan and Environmental Assessment* (NPS 1986). As described under alternative A, a limited regeneration program will be implemented for selected vegetative types, in lieu of large-scale reforestation efforts. Prescribed fire may be used as a tool in the management of forest vegetation and wildlife.

Table 7: Management Zoning – Alternative D

Zone/Subzone	Acres		Percentage of Lakeshore
Natural Zone			
Outstanding natural feature subzone	2,825		4.1
Protected natural area subzone	300		0.4
Primitive environment subzone	12,471		17.9
Natural environment subzone	25,385	(220)*	36.6
Subtotal	40,981		59.0
Historic Zone	372		0.5
Park Development Zone	268	(67)*	0.4
Special Use Zone			
State-owned (submerged lands) subzone	27,230		39.3
Reservation of use subzone	206		0.3
Inholdings (federal, local, and private) subzone	315		0.5
Subtotal	27,751		30.1
Total	**69,372**	**(287)***	**100.0**

*Acreage in parentheses denotes land that is outside the boundary; if acquired, this acreage would be added to the total lakeshore acreage.

To determine whether the lakeshore's natural resources are being adversely affected by visitor use, a long-term monitoring program will be established. Managers will use this information to establish the resource carrying capacity for a particular site. Areas where carrying capacities might have to be established include the sandspits on Raspberry, Oak, Rocky, Outer, and Michigan islands.

Management plans will be prepared for wildlife species, and the feasibility and desirability of reestablishing species that have been extirpated from this region will be determined on a species-by-species basis.

The National Park Service will cooperatively manage the lakeshore's fishery resources, particularly the spawning reefs and shoals within the lakeshore boundaries (0.25 mile out from each island). An in-house water monitoring schedule will be established to ensure that the highest water quality standards are maintained. The temporary wet-fall air quality monitoring site on Outer Island has been removed, and the lakeshore staff is considering the establishment of a permanent air quality monitoring site.

Cultural Resources

Under alternative D the National Park Service would pursue the acquisition from Wisconsin only of enough lake bottom land to protect the integrity of submerged cultural resources. If these resources were acquired by the National Park Service they would be intensively surveyed, tested, and evaluated; appropriate sites would be nominated to the National Register of Historic Places. An underwater resource study would be conducted, and steps would be taken to prevent adverse effects because of development, visitor use, or resource management activities. The light stations would be managed under

agreements with the U.S. Coast Guard. A special history study would be completed about the role and function of the Apostle Islands light stations in the context of navigation on the Great Lakes. This study would help guide preservation and interpretive programs. The types of management actions under this alternative would include the interpretation and maintenance of historical landscapes; the interpretation and rehabilitation or stabilization of historic structures; the interpretation of historic sites; and interpretive tours of historic structures.

ACCESS AND CIRCULATION

Under alternative D access to mainland units and the islands would be improved, and opportunities would be available to make some islands available to all visitors, at an affordable cost.

Land Access

The road into Little Sand Bay would be paved, and a new road would be developed to the proposed harbor complex and employee housing area at the northeast end of Little Sand Bay. If found desirable by all interested parties, a road could be constructed from the harbor complex to the Point Detour campground. Road access to the shoreline would be improved by upgrading Meyers Road and Sand Point Road. (Options to use federal funds to improve and maintain nonfederally owned roads are discussed in appendix F.)

Water Access

Convenient and affordable transportation would be provided for visitors to Sand, Raspberry, Oak, Manitou, Stockton, and Basswood islands. Tour boats would pass by Hermit and Devils islands and Squaw Bay. Seeing and learning about the natural and cultural resources of these islands would give visitors a good understanding of the lakeshore. NPS personnel would provide interpretive services on selected tours; in addition concession boat operators would be trained to provide further interpretation. To ensure access to the islands, it may become necessary for the federal government to subsidize transportation systems (see appendix C). Tour boats and a water taxi service would operate from both Bayfield and Little Sand Bay.

VISITOR USE AND INTERPRETATION

Mainland

Facilities would be developed at Little Sand Bay and Bayfield to encourage both day and overnight use. Much of the mainland use would be consolidated at Little Sand Bay.

To serve visitors arriving from the west on Wisconsin 13, the Meyers Road lake access near Squaw Bay would be improved, and a small visitor information station (designed to operate with or without staffing) would be built. A parking area for 30 to 50 cars would serve the information station, the trailhead, and a 20-site picnic area.

A viewpoint, including an interpretive exhibit and trailhead parking for about 10 cars, would be developed at the Sand Point Road lake access.

Little Sand Bay. The tour boat concession would operate from the marina facility, which was reconstructed in 1987. A ticket sales area would be provided, and parking for about 50 cars would be developed at the marina.

The visitor contact station would be remodeled to function with or without staffing. New interpretive exhibits would be provided and would be available at all times. New restrooms would be in a separate building designed to function with future development, and they would be available on a 24-hour basis. A 50-site NPS campground would be developed to augment existing public and private campgrounds (see Park General map).

The Red Cliff Band of the Lake Superior Chippewa would be encouraged to develop and maintain the Point Detour campground primarily for recreation vehicles. As mentioned under "Access and Circulation," a road could be constructed from the harbor complex to the Point Detour campground.

A 10- to 12-mile trail would be developed along the shoreline bluffs between Squaw Bay and Little Sand Bay. The trail would be designed for cross-country skiing and snowshoeing as well as hiking. Alignment of the trail would take into consideration the needs and protection of wildlife, especially in winter. Interpretation along the trail would focus on natural, cultural, and recreational aspects of the area. Because of the narrowness of the mainland unit, the trail would have to be developed in cooperation with adjacent landowners to ensure minimum resource disturbance, to take full advantage of lakeshore views, and to maximize visitor safety. If feasible, a trail link to the Point Detour campground would be built. Meyers Road and Sand Point Road would provide year-round access to the trail. Menard/Engholm Road would provide unplowed winter access to the shoreline trail for skiers and snowshoers.

When the Little Sand Bay dock facilities exceeded capacity, a new harbor complex would be built at the northeast end of Little Sand Bay, as described in the approved 1978 *Proposed Mainland Development Plan* and in the 1982 addendum to the *Little Sand Bay Development Concept Plan*. The complex would include a breakwater and docking facility, a boat-launching ramp, a sewage-pumping station, and a boat-fueling facility. The docks would be designed to accommodate tour, rental, visitor, and administrative boats.

The tour boat concession would be expanded to include boat rental, a boat-fueling service, and a full-range campstore.

A new ranger station/visitor contact station would be built next to the proposed harbor facilities. There would be space for interpretive exhibits, an information desk, public restrooms, and offices. Parking would be provided for both visitors and employees; a separate parking area would be provided for overnight parking.

After this phase of development was completed, the old visitor contact station would be removed and the site converted to a 30-site picnic area. The restrooms developed during the initial phase of implementation for this plan would remain. The marina would be retained for visitor and administrative use. An interpretive loop trail would be developed to link the Little Sand Bay bog/slough and the Hokenson Brothers Fishery and would connect to the lakeshore trail (see Mainland – Bayfield Peninsula map for alternative D).

The other nonhistoric existing structures at Little Sand Bay would be removed or demolished. Development of roads and trails on the mainland would take into account planning to restore wolf habitat in northern Wisconsin.

Bayfield. The visitor center would be moved from the Bayfield County courthouse to another location near Bayfield where there would be a view of Lake Superior and the Apostle Islands.

Information Stations. If feasible, the National Park Service would work with local communities and agencies to develop a cooperative information center at the junction of US 2 and Wisconsin 13. Information kiosks would be placed at the marinas in Ashland, Washburn, Port Superior, Bayfield, Cornucopia, Madeline Island, and Red Cliff.

Islands with Structured Use and Tour Boat Access; Some Facility Development

Islands that would be routinely served by the tour boat would include Sand, Raspberry, Oak, Manitou, Basswood, and Stockton (see Park General map). The primary focus of activities would be on day use. Most existing campsites would remain, but island camping would not be emphasized. Specific proposals for each island are discussed below.

Sand Island. The dock at Lighthouse Bay would be reconstructed, and a trail would be built from the dock to the light station. The light station would no longer be used for employee quarters, but it would be restored sufficiently to allow visits to the tower when an interpreter was present. A historic structure report would be prepared to guide restoration. The trail from the light station to East Bay would be rerouted and hardened as necessary to protect low wet areas.

The existing dock in East Bay would be rehabilitated, and the campground would be converted to a picnic area. A ranger residence would be relocated closer to the dock, and a picnic area would facilitate visitor contact, interpretation, and protection. The historic landscape at the Noring farmstead would be maintained. Interpretive programs would include at least the farmstead, the 240-year-old white pine stand, and the light station.

When use-and-occupancy reservations and life estates for portions of the island expire, the trail system would be expanded to include the National Register properties on the south side of the island. The National Park Service would consider the feasibility of constructing a dock in this area.

Raspberry Island. To protect the fragile sandspit, the campsites on Raspberry Island would be removed and the island designated for day use only. The existing trail would be developed into an interpretive loop trail through the unlogged forest. A historic structure report would determine the condition and structural capacity of the light station, and a historic furnishings study would determine the feasibility of refurnishing parts of the light station to reflect the 1920s. These studies would provide the necessary information and direction for further restoration efforts. Interpretation of the light station would continue.

Oak Island. The trail system on Oak Island would be expanded to include the Schroeder Lumber Company logging camp 5, and vegetation would be managed to keep the camp features visible. Forest history, logging, and prehistoric water levels evident from the beachlines would be interpreted on site.

Manitou Island. The historic fish camp on Manitou Island would continue to be interpreted.

Basswood Island. A dock would be built near the quarry to accommodate the tour boat, water taxi, and visitor boats. The quarry area would be partially cleared of trees and shrubs, and a self-guiding trail would be constructed through the quarry site. The historic landscape of the McCloud-Brigham farmstead, including the remnant orchard, would be maintained. A loop trail would connect the quarry, farmstead, docks, and camping areas. Interpretation of the farmstead and quarry would be through wayside exhibits and publications. The trails would be developed to be compatible for skiing and snowshoeing as well as hiking. Guided ski/snowshoe trips under commercial use permits would be encouraged.

Stockton Island. A footbridge would be constructed across the inlet at Quarry Bay for hiker access to Presque Isle. A loop trail form Quarry Bay to Presque Isle to Trout Point would be considered. The quarry would be cleared so it could be seen from the trail, and a loop through the site could be added. The Trout Point logging camp would be interpreted.

A wayside exhibit at Julian Bay would interpret the shipwreck *Noquebay*, and a map of the wreck would be developed for divers and snorkelers with valid permits to visit the site. A management plan for the shipwreck would be developed to guide public use, and the park would continue an energetic education campaign about the importance of not removing artifacts. The site would be monitored for artifact loss, and if any such loss endangered the site's integrity, the Park Service would stop issuing diving permits.

The campsites at Quarry Bay would be clearly defined. A boardwalk or other system would be installed to channel use and protect the fragile sand beach vegetation. The visitor contact station at Presque Isle would have permanent interpretive exhibits in place.

Islands with Independent Use and Access; Little Facility Development

This group of islands would serve those visitors who have their own means of access other than tour boats and who seek a more independent, challenging, or remote experience. Included would be York, Hermit, Michigan, Outer, Cat, Ironwood, Otter, South Twin, Rocky, and Devils islands (see Park General map). Specific proposals for each island are described below.

York Island. The north beach of York Island provides an ideal landing site for visitors with hand-powered watercraft, such as kayaks. No new campsites would be provided, and camping would not be allowed on the fragile sandspit.

Hermit Island. The primary landing and trailhead at Hermit Island would be the sand beach on the north shore of the island. A trail would connect the beach landing, quarry, Wilson's cabin site, Cedar Bark Lodge site, the rocky coast northwest of the gull colony, and the campsites. Wayside exhibits or publications would provide interpretation.

Michigan Island. Campsites on the Michigan Island sandspit would be removed, and the island would be designated for day use only. A boardwalk or other system would be installed at the sandspit to channel use and protect fragile beach vegetation. The exterior of the light station would be rehabilitated and preserved as part of the historical scene, and the interior would be stabilized to prevent deterioration. A cultural landscape report would be completed, and the station grounds would be maintained to show how they looked historically. Interpretive exhibits would tell the story of the light station and explain resource protection measures.

Outer Island. The exterior of the Outer Island light station would be rehabilitated and preserved, and the interior would be stabilized. A self-guided interpretive trail would be built to the unique hemlock stand near the light station. An interpretive exhibit at the sandspit on the southern end of the island would explain the sensitivity of the sandspit. Interpretation would also tell about the Schroeder Lumber Company logging camp and the associated railroad landing. Even though the logging camp would be interpreted, the site itself would be allowed to revegetate after the historical scene was recorded.

Ironwood and Cat Islands. Both Ironwood and Cat islands offer suitable landing sites for recreationists with hand-powered watercraft, such as kayaks. Permits would be required for overnight use.

Otter Island. A study would be conducted to determine if the dock at Otter Island is altering the configuration of the sandspit and to recommend whether it should be modified, relocated, or removed.

Rocky and South Twin Islands. The anchorage between these islands is popular with sailboaters because it offers a safe mooring spot. Employee quarters and the small interpretive station on South Twin Island would be removed. The campsites and ranger quarters near the dock on Rocky Island would be retained, as well as interpretive signs at the Nies fish camp. When the life estate and use-and-occupancy agreements on Rocky Island expire, the trail system would be expanded, and the Hadland fish camp, which is listed on the National Register, would be interpreted.

Devils Island. The exterior of the light station would be rehabilitated and preserved to help recreate a historical scene, and the interior would be stabilized. A cultural landscape report would be done to guide maintenance activities and interpretation. The tour boat would pass by Devils Island so visitors could see the spectacular rock caves.

Islands Reserved for Future Use and Development

Bear and Long islands have good potential for visitor use. However, the most desirable locations for a dock and visitor activities on Bear Island are under life estates and use-and-occupancy agreements. When these agreements expire and resource studies have been completed, visitor use proposals would be considered. Long Island is a new addition to the lakeshore, and no visitor use would be considered until ongoing basic resource inventories have fully evaluated natural and cultural resources.

Islands with Restricted Use and Access

Public use on North Twin, Gull, and Eagle islands would continue to be restricted to protect sensitive resources and the unique opportunity for scientific studies.

Carrying Capacity

The estimated annual facility capacity for alternative D is shown in table 8. Proposed facility modifications that have been incorporated into these estimates include the addition of parking spaces at the Little Sand Bay, Meyers Road, and Sand Point areas; the relocation of the Bayfield headquarters and the expansion of its parking facilities; the construction of a 50-site campground at Little Sand Bay; and changes in tour boat schedules, routes, and capacities.

Total park capacity would be approximately 71 percent higher under this alternative as compared to existing conditions. The capacity of the islands would actually be about 1 percent lower than under existing conditions; however, the capacity of the mainland zone would increase by about 135 percent. (A table comparing the capacity of each alternative is included in appendix I.) Peak year visitation (138,000) would be equivalent to about 16 percent of total capacity under this alternative.

Table 8: Annual Facility Carrying Capacity – Alternative D

Islands	Recreation Visits
Private Boats*	211,000
Tour Boats	25,000
Subtotal	236,000
Mainland	
Bayfield Headquarters	416,000
Little Sand Bay	141,000
Meyers Road	62,000
Sand Point	12,000
Subtotal	631,000
Total Facility Capacity	**867,000**

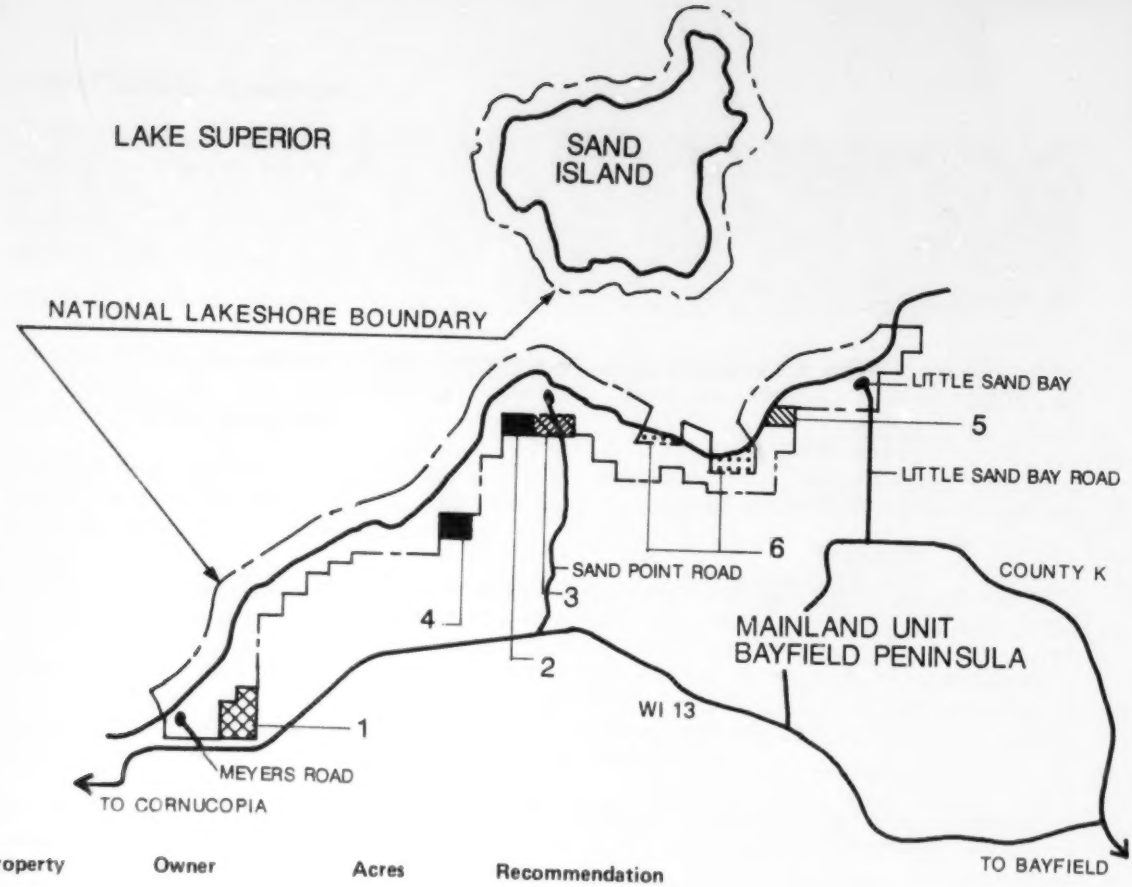
* Private boats include privately owned craft, charter boats, and water taxi service.

BOUNDARY MODIFICATIONS AND LAND ACQUISITION

The National Park Service would attempt to acquire rights to the Little Sand Bay, Meyers, and Sand Point/Berwager road corridors to improve access into the mainland unit. Acquisition could be accomplished through a boundary adjustment or some other means (see appendix F).

A proposed boundary adjustment would add three tracts of land to the lakeshore (see Proposed Boundary Adjustments and Land Acquisition map). Tract 1 (about 120 acres) is near Squaw Bay at the west end of the mainland unit. This private property is wooded and has potential for timber harvest, and its acquisition would be necessary to provide adequate space for the proposed lakeshore entrance on Meyers Road. The owner has indicated a willingness to sell to the National Park Service. It is recommended that this property be purchased in fee simple.

Tracts 2 (40 acres, Bayfield County) and 3 (80 acres, private ownership) are wooded sites (second-growth mixed hardwoods) near Sand Point, and they could potentially be harvested. Sand Point is proposed as an access point for the shoreline trail for both summer and winter visitors. A part of the present access road passes through a critical winter yarding area for deer, and if this road was further developed as a winter access point, deer could be seriously affected. Including these two properties within the lakeshore would allow the access road to be built around the yarding area. The most desirable option would be for the National Park Service to purchase these properties in fee simple. If the owners were unwilling to sell, the Park Service would seek to acquire an easement or lease in order to reroute the road and protect the road corridor from incompatible uses such as logging.



Property	Owner	Acres	Recommendation
1	Private	120	Add to lakeshore; purchase
2	Bayfield County	40	Add to lakeshore; purchase or cooperative agreement
3	Private	80	Add to lakeshore; purchase or cooperative agreement
4	Bayfield County	40	Cooperative agreement
5	Russell Township	51.42	Cooperative agreement
6	Red Cliff Band of Lake Superior Chippewa	–	Cooperative agreement (these lands are excluded from the lakeshore boundary)

Roads	Owner	Acres
Meyers	Russell Township	3.3
Sand Point	Russell Township	29.5
Little Sand Bay	Russell Township	17.5

ALTERNATIVES D AND E
PROPOSED BOUNDARY ADJUSTMENTS AND LAND ACQUISITION

APOSTLE ISLANDS NATIONAL LAKESHORE/WISCONSIN

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Tracts 5 (40 acres, Bayfield County) and 6 (about 52 acres, Russell Township) are within the lakeshore boundary. Tract 5 is classified as forest cropland and is one parcel of an entire section of forest cropland. Eventually this tract would probably be logged, which would be incompatible with lakeshore values. The proposed shoreline trail would probably be routed through this property because of the deep ravines closer to the shoreline. The county does not wish to sell, so the Park Service would seek a cooperative agreement with the county to allow trail development and to protect the tract from logging.

Tract 6 bisects the mainland unit. It was acquired by Russell Township from the county, which had acquired it through tax default. The tract is partly wooded (second-growth mixed hardwood) and fronts Lake Superior. Because it divides the mainland unit, there is no feasible bypass route for the proposed shoreline trail. Up to now the township has indicated it is unwilling to sell this tract, and under these circumstances the Park Service would seek a cooperative agreement or an easement to allow trail development, with a sufficient buffer zone to protect scenic, cultural, and natural values along the trail.

Two tracts of land with considerable beach and lake shoreline frontage, as well as Sand River frontage, are owned by the Red Cliff Band of the Lake Superior Chippewa and are outside the national lakeshore boundary (see tract 7 on the Proposed Boundary Adjustments and Land Acquisition map). These tracts could be critical to the development of the proposed shoreline trail, especially for crossing the Sand River. The National Park Service would seek a cooperative agreement with the Red Cliff Band to develop the shoreline trail and to protect scenic, cultural, and natural values along the trail.

The National Park Service would also pursue every opportunity to acquire outstanding nonfederal mineral rights as they become available and would acquire in fee 36.45 acres of privately owned land on Long Island.

LAKESHORE OPERATIONS

Mainland employee housing would be constructed on a site east-northeast of the proposed Little Sand Bay ranger station/visitor center complex. On-site park staff housing would be required to provide 24-hour resource and visitor protection services in the Little Sand Bay area. A maintenance operation would be placed in Little Sand Bay east of the proposed employee housing area. The maintenance complex would serve the Little Sand Bay development and nearby islands.

A maintenance facility would be placed in the Bayfield vicinity to service the Bayfield visitor center, NPS headquarters vehicles, boats, and other equipment, plus the maintenance needs on a majority of the islands. Park headquarters would be moved from the leased space in the old Bayfield County courthouse to a new visitor center location. Seasonal staff would be stationed on Sand, Raspberry, Oak, Manitou, and Stockton islands. Staffed locations would be subject to change based on revised operating needs. Staffing levels would vary at each site, depending on visitor services and resource protection needs.

ALTERNATIVE E – PARKWIDE EMPHASIS (NPS-PREFERRED ALTERNATIVE)

Alternative E is the NPS-preferred alternative for Apostle Islands National Lakeshore, and in many ways it is a blend of alternatives C and D. Under this alternative visiting the mainland unit would offer an excellent shoreline experience, especially a feeling for the beauty and power of Lake Superior. This experience would be complemented by programs and facilities on the islands that would give visitors opportunities to experience their character, beauty, and remoteness. Visitors would be able to choose from a broad range of experiences requiring different levels of commitment in terms of time, energy, and expense. A low-commitment experience would rely on public transportation to a selected group of islands and would provide a moderate degree of facilities and services, such as campsites, shelters, sanitary facilities, trails, and interpretive programs. A high-commitment experience would be based on self-reliance, independent transportation, and few if any facilities. In general, the amount of park development and the structure of NPS-provided programs would decrease proportionately to the distance from the mainland. The visitor experience on the mainland and inner islands would tend to be assisted to a much greater extent than the more primitive recreational opportunities available on the outer islands.

Campsites on the innermost islands (those within 8.5 miles of a port) would generally have water, tables, grills, tent pads, and a privy. Campsites on the "middle" group of islands (for example, Rocky, South Twin, and Manitou islands and the western portion of Stockton Island) would have grills, tent pads, and a privy. Campsites on the outermost islands would be primitive, and no amenities would be provided. The only designated sites would be those necessary for resource protection.

MANAGEMENT ZONING

The existing management zoning scheme would remain in effect, with the following exceptions. A primitive environment subzone would be designated for Cat and Ironwood islands and parts of Outer, Devils, and Michigan islands. If the submerged lands were acquired from the state (as described under alternative C), they would be placed in the natural environment subzone; shipwrecks, however, would be placed in the historic zone. The developed areas on Meyers Road and Sand Point Road/Berwager Road would be placed in the park development zone. If the Little Sand Bay and the Sand Point/Berwager road corridors were acquired through a boundary adjustment, they would be placed in the development zone. If the Bayfield County and the other two privately owned properties were acquired through a boundary adjustment, they would be added to the natural zone. Historic zoning would be expanded to include all significant historic sites within the park (see table 9).

Table 9: Management Zoning – Alternative E

Zone/Subzone	Acres		Percentage of Lakeshore
Natural Zone			
Outstanding natural feature subzone	2,825		4.1
Protected natural area subzone	300		0.4
Primitive environment subzone	12,185		17.5
Natural environment subzone	52,901	(220)*	76.3
Subtotal	68,211		98.3
Historic Zone	372		0.5
Park Development Zone	268	(67)*	0.4
Special Use Zone			
Reservation of use subzone	206		0.3
Inholdings (federal, local, and private) subzone	315		0.5
Subtotal	521		0.8
Total	**69,372**	**(287)***	**100.0**

*Acreage in parentheses denotes land that is outside the boundary; if acquired, this acreage would be added to the total lakeshore acreage.

RESOURCE MANAGEMENT

Natural Resources

In general, the long-term natural resource management objective of the National Park Service is to restore and maintain the biologic diversity of the dynamic ecosystem that would exist today if human activities such as logging had not intervened. The significance of lakeshore resources in terms of the biologic diversity of the fragmented natural ecosystem of the western Great Lakes area is currently under study.

The immediate management objective for natural resources would be to ensure their protection and preservation, in accordance with the approved *Resources Management Plan and Environmental Assessment* (NPS 1986). As described under alternative A, a limited regeneration program will be implemented for selected vegetative types, in lieu of large-scale reforestation efforts. Prescribed fire may be used as a tool in the management of forest vegetation and wildlife.

To determine whether the lakeshore's natural resources are being adversely affected by visitor use, a long-term monitoring program will be established. Lakeshore managers will establish the resource carrying capacity for a particular site after reviewing the effects of use. Particular areas where carrying capacities may have to be established include the sandspits on Raspberry, Oak, Rocky, Outer, and Michigan islands.

Management plans will be prepared for wildlife species that can be hunted and trapped, and the feasibility and desirability of reestablishing species that have been extirpated from this region will be determined on a species-by-species basis.

The National Park Service will cooperatively manage the lakeshore's fishery resources, particularly the spawning reefs and shoals within the lakeshore boundaries (0.25 mile out from each island). An in-house water monitoring schedule will be established to ensure that the highest water quality standards are maintained. The lakeshore staff is considering the establishment of a permanent air quality monitoring site to replace the Outer Island monitoring site, which has been removed.

Cultural Resources

Under alternative E the National Park Service would seek to provide the highest level of preservation feasible for lake bottom lands within the 0.25-mile boundary, working with the state of Wisconsin. Actions to be pursued could include cooperative agreements, new legislation, or acquisition of the lands by the National Park Service. All cultural resources within this area would be managed in accordance with NPS policy. An underwater resource study would be conducted, and actions would be taken to prevent any adverse effects because of development, visitor use, or resource management activities. Navigational aids (lights) would continue under the jurisdiction of the U.S. Coast Guard, while the National Park Service would seek to own and manage the historic structures associated with the navigational aids.

A special history study about the role and function of the Apostle Islands light stations would be completed to guide interpretation and preservation actions. Management actions would include interpreting and maintaining historic landscapes, interpreting and stabilizing or rehabilitating historic structures, interpreting historic sites, and conducting guided tours of historic structures.

A comprehensive historic resource study would be undertaken to identify historic and archeological resources in the national lakeshore and to determine if they meet the criteria for listing on the National Register of Historic Places. Those resources that do meet the criteria would be nominated to the National Register. A base map would also be developed to show the location of the resources. The resource study would be coordinated with the underwater resource study.

Carrying capacity studies would need to be initiated for several history structures and sites to establish acceptable visitor use levels to protect the structures and sites, as well as the visitor experience.

ACCESS AND CIRCULATION

Under this alternative road access to the mainland unit would be improved, and travel to selected islands would be made available to all visitors at an affordable cost.

Land Access

The road into Little Sand Bay would be paved, and a new road would be developed to the proposed harbor complex and employee housing at the northeast end of Little Sand Bay. If feasible, a road would be constructed from the harbor complex to the Point Detour campground. An all-season access road to the shoreline would be developed using Meyers Road and Sand Point Road. As described under alternative C, the National Park Service would have to get authority to expend federal funds to improve and maintain nonfederally owned roads (see appendix F for options).

Water Access

Convenient and affordable transportation would be provided for visitors to Sand, Raspberry, Oak, and Basswood islands. Tour boats would pass by Hermit and Devils islands and Squaw Bay. The variety of natural and cultural resources on all these islands would give visitors a comprehensive introduction to the lakeshore. Interpretation would be provided on selected tours by NPS personnel, and concession boat operators would also be trained to provide additional interpretive information. To ensure access to the islands, it may become necessary for the federal government to subsidize the transportation system (see appendix C for subsidy options).

Tour boats would operate from both Bayfield and Little Sand Bay. To improve financial feasibility, the concessioner would also be allowed to rent camping equipment and simple camping shelters, and also to operate a boat-fueling facility and a small campstore. In addition to tour boats, a water taxi service would continue to be offered.

Through concession contracts and commercial use permits, the National Park Service would encourage guided trips to the islands for both summer and winter activities. When Lake Superior ice conditions are suitable, guided tours could be offered to special scenic features, such as the frozen caves at Squaw Bay.

VISITOR USE AND INTERPRETATION

Mainland

Facilities would be developed at Little Sand Bay and Bayfield to encourage both day and overnight use. Much of the mainland use would be consolidated at Little Sand Bay, assuming that access roads could be improved. (See the Mainland – Bayfield Peninsula map for alternatives D and E.)

To serve visitors arriving from the west on Wisconsin 13, the Meyers Road lake access at Squaw Bay would be improved, and a small visitor information station would be built. A parking area for about 30 to 50 cars would serve the information station, the trailhead, and a 20-site picnic area. The information station could either be staffed or unstaffed.

A viewpoint, with an interpretive exhibit and trailhead parking for 10 cars, would be developed at the Sand Point Road lake access.

Little Sand Bay. The tour boat concession would operate from the marina facility reconstructed in 1987. A ticket sales area and parking for 50 cars would be provided at the marina.

The visitor contact station would be remodeled to function with or without staffing, and the new interpretive exhibits would be accessible when the contact station was not staffed. Restrooms would be provided in a new building that would be designed to be compatible with future development, and they would be available on a 24-hour basis. The National Park Service would develop a 50-site campground to supplement existing public and private campgrounds.

The Red Cliff Band of the Lake Superior Chippewa would be encouraged to develop and maintain the Point Detour campground to primarily serve recreation vehicles.

A 10- to 12-mile hiking trail would be developed along the shoreline bluffs between Squaw Bay and Little Sand Bay. The trail would be designed for cross-country ski and snowshoe use as well as summer use. Layout of the trail would take into consideration the needs and protection of wildlife, especially in winter. Natural and cultural sites along the trail would be interpreted through wayside exhibits. Because of the narrowness of the mainland unit, the trail would have to be developed in cooperation with other landowners to ensure minimum resource disturbance, to take full advantage of lakeshore views, and to maximize visitor safety. Meyers Road and Sand Point Road would provide year-round access to the trail. Menard/Engholm Road would provide unplowed winter access to the shoreline trail for skiers and snowshoers.

When existing facilities at Little Sand Bay are no longer adequate or their total capacity has been exceeded, a new harbor complex would be built at the northeast end of Little Sand Bay, as proposed in the approved 1978 *Proposed Mainland Development Plan.* The complex would include a breakwater and docking facility, a boat-launching ramp, a sewage-pumping station, and a boat-fueling facility. The docks would be designed to accommodate tour, rental, visitor, and administrative boats. The concession would be expanded to include boat rental, a boat-fueling service, and a campstore.

Because Little Sand Bay would be the focal point of mainland visitor activity, a new interpretive center would be built near the proposed harbor facilities. Space would be provided for interpretive exhibits, an auditorium, an information desk, cooperating association sales, public restrooms, and offices. The ranger station and associated offices would also be a part of this new building. The parking area would accommodate visitor and employee vehicles, and a separate parking facility would be developed for overnight parking.

Upon completion of the new interpretive center, the existing visitor contact station would be removed, and the site would be converted to a 30-site picnic area. The restrooms that were developed during the initial implementation of this plan would remain. The marina would be retained for visitor and administrative use. An interpretive loop trail would be developed to link the Little Sand Bay bog/slough and the Hokenson Brothers Fishery and would connect to the lakeshore trail. The other nonhistoric structures at Little Sand Bay would be removed or demolished.

Bayfield. Lakeshore headquarters would remain in the old Bayfield County courthouse, along with a visitor contact station.

Information Stations. If feasible, the National Park Service would cooperate with local communities and agencies in the development of an information center at the junction of US 2 and Wisconsin 13. Information kiosks would be placed at the marinas in Ashland, Washburn, Port Superior, Bayfield, Cornucopia, Madeline Island, and Red Cliff.

Islands with Structured Use and Tour Boat Access; Some Facility Development

Islands accessible by tour boat would include Sand, Raspberry, Oak, Manitou, Basswood, and Stockton (see Park General map); these islands would also remain accessible by private boats. Proposed development would be for both resource protection and visitor convenience. Mooring buoys could be used as a means of managing overnight sailboat use in the more congested areas. The goal of interpretation would be to weave together the specific stories of each island into a comprehensive picture of the lakeshore. Specific proposals for each island are discussed below.

Sand Island. The Sand Island light station would be restored sufficiently to allow visitors to tour the tower when accompanied by an interpreter. A historic structure report would be completed to guide restoration efforts. The trail from the light station to East Bay would be rerouted and hardened as necessary to protect the low wet areas along the present trail. The historical landscape at the Noring farmstead would be maintained. Interpretive programs would focus on the farmstead, the 240-year-old white pine stand, and the light station.

The campground at East Bay would be expanded to about 10 sites, and concessioner-managed camping shelters would be provided. A ranger residence would be constructed closer to the dock and campground to replace the existing ranger station, which is 0.5 mile from the dock.

When the use-and-occupancy reservations and life estates expire, a dock would be provided in West Bay, the trail system would be expanded to include the National Register properties, and additional campsites would be provided. The West Bay Club building could be adaptively used for overnight lodging if feasible, possibly through the American Youth Hostels, Inc.

Raspberry Island. Because of severe resource damage from camping on the sandspit, Raspberry Island would be designated for day use only. Wayside exhibits would be installed to interpret sandspit ecology. Raspberry Island is one of the few unlogged islands in the lakeshore, and a loop trail would be developed from the light station to interpret this virgin forest.

Interpretation of the light station would continue. A historic structure report and a historic furnishings study would be done to determine the condition and structural capacity of the light station and the feasibility of refurnishing parts of the light station to the 1920s. These studies would provide the necessary information and direction for further restoration efforts. If these studies determine that it is appropriate and feasible, efforts would be made to obtain the original Fresnel lens, which is now in the Madeline Island Historical Museum, and to restore it to the light station.

Oak Island. Additional campgrounds would be developed on Oak Island, with sites determined by a future plan. Prehistoric beachlines, forest history, and logging would be interpreted through wayside exhibits and publications. The trail system would be extended to include Schroeder Lumber Company logging camp 5, where the vegetation would be managed to maintain the historical landscape.

Manitou Island. Two to five additional campsites would be developed on Manitou Island, if a suitable site could be found. An interpretive loop trail would be built to connect the campsites and dock with the fish camp and an archeological site on the southeast side of the island. Personal interpretive services at the fish camp would be continued, and a self-guiding site brochure would be developed.

Basswood Island. The historic dock would be reconstructed at the quarry on Basswood Island to accommodate the tour boat as well as visitor boats. The historical landscape of the quarry area and the McCloud-Brigham farmstead would be maintained. A self-guiding interpretive trail would be constructed through the quarry site. The farmstead and quarry would be interpreted through wayside exhibits and publications.

A small campground would be constructed at the north dock, and the campsites on both the south and west sides of the island would be retained. Concession-operated camping shelters would be provided. A loop trail would connect the quarry, farmstead, docks, and

camping areas. New hiking trails would also be designed for skiing and snowshoeing. Winter camping and guided ski/snowshoe trips under commercial use permits would be encouraged.

Stockton Island. On Stockton Island a footbridge would be constructed across the inlet at Quarry Bay to provide hiker access to Presque Isle. A loop trail connecting Quarry Bay, Presque Isle, and Trout Point would be developed if feasible. A loop through the quarry would be added to the existing trail. The Trout Point logging camp would be interpreted.

A wayside exhibit at Julian Bay would interpret the shipwreck *Noquebay*, and a map of the wreck would be developed for divers and snorkelers who have valid permits to visit the site. A management plan for the shipwreck site would be prepared to guide public use of this site. NPS staff would continue an energetic education campaign about the importance of not removing artifacts. The site would be monitored for artifact loss, and if any such loss endangered the site's integrity, the Park Service would stop issuing diving permits.

The campground at Quarry Bay would be rehabilitated, and the sites would be clearly delineated. A boardwalk or other system would be installed to channel use and protect the sensitive sand beach vegetation. Permanent interpretive exhibits would be installed at the visitor contact station on Presque Isle.

The National Park Service would examine visitor and development impacts at Presque Isle and on the adjacent tombolo to guide future management decisions about visitor use development on Stockton Island.

Islands with Independent Use and Access; Little Facility Development

This group of islands would serve those visitors who can arrange their own transportation and who seek a more challenging and primitive experience. Most facilities would be for resource or visitor protection rather than visitor convenience. This group of islands would include York, Hermit, Michigan, Outer, Cat, Ironwood, Otter, South Twin, Rocky, and Devils (see Park General map). Specific proposals for each island are described below.

York Island. The north landing site provides an excellent opportunity for visitors with hand-powered watercraft, such as kayaks. One or two small additional campsites would be designated along the north beach. No camping would be allowed on the fragile sandspit, and no docking facilities would be provided.

Hermit Island. The primary landing and trailhead on Hermit Island would be the sand beach on the north shore of the island. Campsites would be developed near this landing and in an area on the western coast. A trail would connect the beach landing, quarry, Wilson's cabin site, Cedar Bark Lodge site, the rocky coast northwest of the gull colony, and the campsites. Wayside exhibits or publications would provide interpretation.

Otter Island. A study would be conducted to determine if the dock at Otter Island is altering the configuration of the sandspit and to recommend corrective action. A few campsites would be developed on the northeast corner of the island.

Ironwood and Cat Islands. Both Ironwood and Cat islands offer good landing sites for visitors who enjoy the challenge of using hand-powered watercraft, such as kayaks, and opportunities for solitude.

Rocky and South Twin Islands. The anchorage between these islands is popular with sailboaters because it offers a safe place to moor. The small interpretive station on South Twin Island would be removed. Alternatives for providing other interpretation at the site would be considered by the lakeshore staff. The campsites on Rocky Island would be improved, and satisfactory quarters would be provided for employees. Interpretive signs at the Nies fish camp would remain. When the life estate and use-and-occupancy agreements on Rocky Island expire, the trail system would be extended, campsites would be added at Erickson Beach, and the Hadland fish camp (which is listed on the National Register) would be interpreted.

Devils Island. The Devils Island light station would be rehabilitated and preserved, and the interior would be stabilized to prevent deterioration. A cultural landscape report would be completed to guide interpretation of the historical scene. Interpretation of the light station would be through signs or publications. The tour boat would pass by Devils Island so visitors could see the spectacular rock caves created by Lake Superior. The National Park Service would pursue an agreement with the U.S. Coast Guard to retain the original Devils Island second-order Fresnel lens on site in the tower.

Outer Island. The light station on Outer Island would be rehabilitated and preserved, and the interior would be stabilized. A self-guided interpretive trail would be built to the unique hemlock stand near the station. The major trails on the island would be maintained only in a primitive state. An interpretive exhibit at the sandspit on the southern end of the island would explain the sensitivity of the sandspit. Interpretation would also explain the significance of the Schroeder Lumber Company logging camp and the logging railroad landing. The historical scene at the logging camp would be maintained.

Michigan Island. The light station on Michigan Island would be rehabilitated and preserved, and the interior would be stabilized to prevent deterioration. The light station grounds would be maintained to allow access by visitors. A cultural landscape report of the light station would be completed to determine the appropriate time period for interpretation and to provide other data for maintaining the historical scene. The informal campsites on the sandspit at Michigan Island would be relocated to a less sensitive site, and a boardwalk or other system would be installed to channel use and protect the fragile beach vegetation. Interpretation of the light station and resource protection measures would be through signs or publications.

Islands Reserved for Future Use and Development

Bear and Long islands have good potential for visitor use. However, the most desirable locations for a dock and other visitor activities on Bear Island are under life estates and use-and-occupancy agreements. When these agreements expire and resource studies have been completed, visitor use proposals would be considered. Long Island is a new addition to the lakeshore, no visitor use proposals would be considered until ongoing basic resource inventories have fully evaluated the significance and sensitivity of natural and cultural resources.

Islands with Restricted Use and Access

Public use of North Twin, Gull, and Eagle islands would continue to be restricted because of the sensitivity of the resources and unique opportunities for scientific studies.

Carrying Capacity

The estimated annual facility capacity for alternative E is shown in table 10. Proposed facility modifications that have been incorporated into these estimates include the addition of parking spaces at the Little Sand Bay, Meyers Road, and Sand Point units; the construction of a 50-site campground at Little Sand Bay; and changes in tour boat schedules, routes, and capacities.

Total park capacity would be approximately 41 percent higher under this alternative as compared to existing conditions. Capacity of the islands would be about 4 percent higher than under existing conditions, while the capacity of the mainland would increase by about 73 percent. (A table comparing the capacities of each alternative is included in appendix I.) Peak year visitation (138,000) would be equivalent to 19 percent of total capacity under this alternative.

Table 10: Annual Facility Carrying Capacity – Alternative E

	Recreation Visits
Islands	
Private Boats*	211,000
Tour Boats	38,000
Subtotal	249,000
Mainland	
Bayfield Headquarters	249,000
Little Sand Bay	143,000
Meyers Road	62,000
Sand Point	12,000
Subtotal	466,000
Total Facility Capacity	**715,000**

* Private boats include privately owned craft, charter boats, and water taxi service.

BOUNDARY MODIFICATIONS AND LAND ACQUISITION

The National Park Service would attempt to acquire rights to the Little Sand Bay, Meyers, and Sand Point/Berwager road corridors so as to improve access to the mainland unit. Acquisition could be accomplished through a boundary adjustment or some other means (see appendix F).

Through a boundary adjustment, three tracts of land would be added to the lakeshore (see Proposed Boundary Adjustments and Land Acquisition map under alternative D). Tract 1 (about 120 acres, private ownership) is a wooded parcel near the west end of the mainland unit and could potentially be harvested for timber. Acquisition is needed to provide adequate space for the proposed entrance to the lakeshore at Meyers Road. The owner is willing to sell to the National Park Service, and it is recommended that this property be purchased in fee simple.

Tracts 2 (40 acres, Bayfield County) and 3 (80 acres, private ownership) are located near Sand Point. These sites are wooded (second-growth mixed hardwoods), and they could potentially be harvested for timber. Sand Point is a proposed access point for the

shoreline trail for both summer and winter use. Part of the present access road passes through a critical winter yarding area for deer. Further development and use of this road for winter access could adversely affect the deer. Including these two tracts within the lakeshore would allow a road to be developed around the yarding area. The most desirable option would be for the National Park Service to purchase these properties in fee simple. If the owners were unwilling to sell, the Park Service would seek an easement or lease so that the road could be rerouted and the corridor protected from incompatible adjacent uses, such as logging.

The National Park Service would acquire in fee 36.45 acres of privately owned land on Long Island.

Tracts 5 (40 acres, Bayfield County) and 6 (about 52 acres, Russell Township) are within the lakeshore boundary. Tract 5 is classified as forest cropland and is one parcel of an entire section of forest cropland. Eventually this tract would probably be logged, which would be incompatible with lakeshore values. The proposed shoreline trail would probably have to be routed through this property because of the deep ravines closer to the shoreline. The county does not wish to sell, so the Park Service would seek a cooperative agreement with the county to allow trail development and to preserve a natural setting along the trail corridor.

Tract 6 bisects the mainland unit. This tract was acquired by Russell Township from the county, which had obtained it through tax default. The tract is partly wooded (second-growth mixed hardwood) and fronts the lake. Because this tract divides the mainland unit and no alternative route is available, it is critical the proposed development of the shoreline trail. If the township was unwilling to sell this tract, the Park Service would seek a cooperative agreement or easement with a sufficient buffer zone along the trail to protect scenic, cultural, and natural values.

Tract 7 consists of two parcels of land with considerable beach and lake shoreline, as well as Sand River frontage. They are owned by the Red Cliff Band of the Lake Superior Chippewa, and they are outside the national lakeshore boundary. These tracts would be critical to the development of the proposed shoreline trail, especially for crossing the Sand River. The National Park Service would seek a cooperative agreement with the Red Cliff Band to develop a trail and to protect scenic, cultural, and natural values.

The acquisition of nonfederal subsurface interests within the lakeshore could be necessary to carry out the purposes for which the lakeshore was established. To determine the need for such acquisition, mineral trends, actvities, and technological advances in extraction techniques would be monitored. If it was determined after a tract-by-tract analysis that lakeshore values would be adversely affected by mineral extraction activities, then the acquistion of nonfederal subsurface interests would be pursued. If it was determined that acquisition was necessary, then donation and exchange would be the preferred methods. Except in the case of donation, owners of subsurface rights would receive compensation if their rights were acquired by the National Park Service. Until it was determined that all nonfederal subsurface rights had to be acquired, applicable federal regulatory authorities would be fully applied to any proposed mineral activity.

LAKESHORE OPERATIONS

Mainland employee housing would be constructed on a site east-northeast of the proposed Little Sand Bay ranger station/visitor center complex. On-site park staff housing

would be required to provide 24-hour resource and visitor protection services in the Little Sand Bay area.

A maintenance operation would be placed in Little Sand Bay east of the proposed employee housing area. The maintenance complex would serve the Little Sand Bay development and nearby islands. A maintenance facility would remain in the Bayfield vicinity to service the Bayfield visitor center and headquarters vehicles, boats and other equipment, and the maintenance needs of a majority of the islands.

Lakeshore headquarters and a visitor contact station would remain in leased space in the old Bayfield County courthouse. The lakeshore's main visitor center would be located at Little Sand Bay, which would leave adequate space in the courthouse to fulfill the needs for additional office and storage space.

Employee quarters would be provided on Sand, Michigan, Devils, Raspberry, Oak, Manitou, Stockton, and Rocky islands. Staffed locations would be subject to change based on revised operating needs. Staffing levels would vary at each site, depending on visitor services and resource protection needs.

MINIMUM REQUIREMENTS ALTERNATIVE

This alternative describes the minimum actions that would be required for the safe and effective operation of Apostle Islands National Lakeshore. The visitor experience would be similar to that described under alternative E, but there would be a greater emphasis on self-reliance, especially in terms of island access. There would also be fewer recreational opportunities on the mainland. Sailing among the islands would continue to be the major visitor experience.

The proposed actions under this alternative are the same as described under alternative E, with the following exceptions:

Federal subsidization of public transportation to the islands would not be an option.

No development would be proposed at Sand Point.

None of the development at Little Sand Bay described as phase II would be undertaken.

A 50-site campground would not be developed at Little Sand Bay.

The Meyers Road area would have only a trailhead, parking for 15 to 20 cars, and an information exhibit. No picnic area or visitor information station would be proposed.

The visitor center would remain in the old Bayfield County courthouse.

There would be no information kiosks proposed at the marinas in Ashland, Washburn, Port Superior, Bayfield, Cornucopia, Madeline Island, or Red Cliff.

The facility capacity for this alternative would be 586,000 people per year (249,000 on the islands and 337,000 on the mainland). Total park capacity would be approximately 16 percent higher under this alternative than under existing conditions.

Total project cost would be $3,092,000 (gross construction cost – $2,520,000, advance and project planning cost – $572,000).

Table 11: Summary and Comparison of Alternatives

	Alternative A – Existing Conditions (No Action)	Alternative B – Primitive Emphasis	Alternative C – Island Emphasis	Alternative D – Mainland Emphasis	Alternative E – Parkwide Emphasis (NPS-Preferred Alternative)
Concept	Continue existing conditions on the mainland and islands.	Emphasize a primitive island experience for visitors, with minimal facility development.	Encourage visitors to spend time on the islands, and develop support programs and facilities.	Provide recreational opportunities on the mainland and day use opportunities on the islands.	Provide recreational opportunities on both the mainland and the islands.
Management Zoning	The national lakeshore includes a total of 69,372 acres of land and water. Areas included in the following zones and subzones would be managed the same under all alternatives: natural zone – outstanding natural features subzone (2,825 acres, 4.1% of the lakeshore) and protected natural area subzone (300 acres. 0.4%); special use zone – reservation of use subzone (206 acres. 0.3%). Differences between the alternatives are shown below:				
	Acres / Percentage of Lakeshore	Acres / Percentage of Lakeshore	Acres / Percentage of Lakeshore	Acres / Percentage of Lakeshore	Acres / Percentage of Lakeshore
Natural Zone					
Primitive environment	– / 0	19,924 / 28.7	4,206 / 6.0	12,471 / 17.9	12,185 / 17.5
Natural environment	37,886 / 54.6	17,962 / 25.9	60,890 / 87.8	25,385(220)* / 36.6	52,901(220)* / 76.3
Historic Zone	370 / 0.5	370 / 0.5	372 / 0.5	372 / 0.5	372 / 0.5
Park development zone	238 / 0.3	238 / 0.3	258 (20)* / 0.4	268 (67)* / 0.4	268 (67)* / 0.4
Special Use Zone					
State-owned (submerged lands) subzone	27,232 / 39.3	27,232 / 39.3	– / –	27,230 / 39.3	– / –
Inholdings subzone	315 / 0.5	315 / 0.5	315 / 0.5	315 / 0.5	315 / 0.5
Resource Management					
Natural Resources	Under all alternatives ensure the protection and preservation of natural resources. Implement a limited regeneration program for selected vegetative types. Use fire as a management tool for forest vegetation and wildlife programs. Determine feasibility and desirability of reestablishing extirpated species within the lakeshore. Monitor use of sandspits and take protective actions wherever use is destroying or causing drastic changes in the composition of beach vegetation, particularly on Raspberry, Oak, Rocky, Outer, and Michigan islands.				

*Acreage in parentheses denotes land that is outside the boundary; if acquired, this acreage would be added to the total lakeshore acreage.

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	Alternative A – Existing Conditions (No Action)	Alternative B – Primitive Emphasis	Alternative C – Island Emphasis	Alternative D – Mainland Emphasis	Alternative E – Parkwide Emphasis (NPS-Preferred Alternative)
Cultural Resources	Conduct an underwater resource study; inventory resources and prepare site reports. No formal protection for submerged resources. Preserve light stations, fishing camps, and logging camps on the National Register. Preserve and interpret other sites according to their significance.	Develop an agreement with Wisconsin to manage and protect known submerged cultural resources. Conduct an underwater resource study, and prevent any adverse effects to resources from development, visitor use, or resource management activities. Preserve National Register properties, and preserve and interpret other sites according to their significance. Complete a special history study of the lakeshore's light stations.	Same as alternative B, except seek to acquire all lake bottom lands within the lakeshore and protect all submerged cultural resources within this area. Interpret and maintain historical landscapes; interpret and rehabilitate or stabilize historic structures; and interpret historic sites.	Same as alternative C, except seek to acquire only enough lake bottom land to protect the integrity of known submerged cultural resources and conduct interpretive tours of selected historic structures.	Same as alternative C, except the National Park Service would seek to provide the highest level of preservation feasible for lake bottom lands within the 0.25 mile boundary, working with the state of Wisconsin. Actions to be pursued could include cooperative agreements, new legislation, or NPS acquisition of the lands.
Access and Circulation					
Land Access	Make no changes in access to the mainland unit.	Seek authority to improve the Meyers Road lake access and construct a small parking area to accommodate use.	Seek authority to slightly realign and pave the road into Little Sand Bay to provide easier access for visitors.	Same as alternative C, plus build a new road to the proposed harbor complex at Little Sand Bay. Upgrade Meyers Road and Sand Point Road to improve shoreline access.	Same as alternative D, except develop all-season shoreline access on Meyers and Sand Point roads.
Water Access	Continue tour boat access to three islands at a moderate passenger fee.	Same as alternative A.	Provide tour boat access to seven islands at a moderate passenger fee.	Provide tour boat access to six islands at a moderate passenger fee.	Provide tour boat access to four islands at a moderate passenger fee.

	Alternative A – Existing Conditions (No Action)	Alternative B – Primitive Emphasis	Alternative C – Island Emphasis	Alternative D – Mainland Emphasis	Alternative E – Parkwide Emphasis (NPS-Preferred Alternative)
Visitor Use and Interpretation					
Meyers Road Access to Squaw Bay	No action.	Construct a small parking area.	No action.	Develop small visitor information station, 30- to 50-car parking area, trailhead, and 20-site picnic area.	Same as alternative D.
Little Sand Bay	Continue visitor contact station and self-guided interpretation at Hokenson Brothers Fishery.	Small as alternative A.	Construct a new visitor contact station and interpretive loop trail to Hokenson Brothers Fishery and bog.	Remodel existing visitor contact station; develop a 50-site campground; construct a 10- to 12-mile shoreline trail. When existing facilities exceed capacity, develop new harbor complex; construct new visitor contact and ranger station; remove existing visitor station and build a 30-site picnic area; remove other nonhistoric structures.	Same as alternative D, except construct a new lakeshore interpretive center to replace Bayfield visitor center.
Bayfield	Continue visitor center and headquarters in old Bayfield County courthouse.	Same as alternative A.	Same as alternative A.	Move the visitor center from the courthouse to a new location where visitors could see the islands.	Convert existing visitor center to a contact station.
Islands with Structured Use and Tour Boat Access; Some Facility Development	Raspberry, Manitou, and Stockton: 24 campsites and 4 group sites, 16.0 mi of maintained trails, 4 docks. Wayside exhibits to be added as identified in the wayside exhibit plan.	Raspberry, Manitou, and Stockton: 22 campsites and 4 group sites; construct boardwalk. Wayside exhibits to be added as identified in the wayside exhibit plan.	Sand, Raspberry, Oak, Manitou, Basswood, Stockton, and Outer: add 33 campsites (74 total and 7 group sites), 3 camp shelters, 23 mi of maintained trail (63.75 mi total), 3 docks (12 total), boardwalk, and quarters for 1 employee. Wayside exhibits to be added as identified in the wayside exhibit plan.	Sand, Raspberry, Oak, Manitou, Basswood, and Stockton: remove 2 campsites (37 total and 7 group sites); add 13.75 mi of maintained trail (47.5 mi total), 3 docks (9 total), 1 boardwalk, and quarters for 1 employee. Wayside exhibits to be added as identified in the wayside exhibit plan.	Same islands as alternative D: add 25 campsites and remove 2 (62 total and 7 group sites); add 6 camp shelters, 19.25 mi of maintained trail (53 mi total), 2 docks (8 total), 1 boardwalk. Wayside exhibits to be added as identified in the wayside exhibit plan.

	Alternative A – Existing Conditions (No Action)	Alternative B – Primitive Emphasis	Alternative C – Island Emphasis	Alternative D – Mainland Emphasis	Alternative E – Parkwide Emphasis (NPS-Preferred Alternative)
Islands with Independent Access; Little Facility Development	Sand, York, Oak, Hermit, Basswood, Michigan, Outer, Cat, Ironwood, Otter, South Twin, Rocky, and Devils: 62 campsites and 9 group sites, 30.6 mi of maintained trails, 39.8 of unmaintained trails, 10 docks, 3 wayside exhibits, 2 employee residences.	Same as alternative A, except add 1.5 mi of maintained trail (32.1 mi total); remove 1 visitor contact station (0 total) and 1 employee residence (1 total); add 2 wayside exhibits (4 total).	York, Hermit, Michigan, Cat, Ironwood, Otter, Devils, and Rocky: add 12 campsites (41 total and 5 group sites), 2.5 mi of maintained trail (8.1 mi total), 1 boardwalk, and 5 wayside exhibits (6 total).	York, Hermit, Michigan, Outer, Cat, Ironwood, Otter, South Twin, Rocky, and Devils: remove 9 campsites (26 total and 4 group sites); add 4.25 mi of maintained trail (17.1 mi total), 1 boardwalk, and 6 wayside exhibits (8 total).	Same islands as alterative D: add 19 campsites (54 total and 4 group sites), 2.75 mi of maintained trail (15.6 mi total), 1 boardwalk, 5 wayside exhibits (7 total).
Islands Reserved for Future Use and Development	Bear and Long: no development	Same as alternative A.	Same as alternative A.	Same as alternative A.	Same as alternative A.
Islands with Restricted Use	Eagle, Gull, and North Twin: no development	Same as alternative A.	Same as alternative A.	Same as alternative A.	Same as alternative A.
Boundary Modifications and Land Acquisition					
Road Corridors	No change	Acquire interest in Meyers Road corridor.	Acquire rights to Little Sand Bay Road corridor.	Acquire rights to Little Sand Bay, Meyers, and Sand Point Road/Berwager Road corridors.	Same as alternative D.
Private Lands and Inholdings	No change	No change.	No change.	Change lakeshore boundary and acquire three tracts (240 acres) in fee or easement for public use; negotiate cooperative agreements for three other tracts for shoreline trail.	Same as alternative D.
Mineral Rights	Acquire outstanding rights if necessary to protect lakeshore values.	Same as alternative A.	Same as alternative A.	Same as alternative A.	Same as alternative A.

	Alternative A – Existing Conditions (No Action)	Alternative B – Primitive Emphasis	Alternative C – Island Emphasis	Alternative D – Mainland Emphasis	Alternative E – Parkwide Emphasis (NPS-Preferred Alternative)
Lakeshore Operations	Continue administrative and maintenance functions in Bayfield and a district ranger operation in Little Sand Bay; park staff stationed on Sand, Raspberry, Oak, Manitou, Stockton, South Twin, Michigan, Outer, and Devils islands.	Same as alternative A; station park staff on Stockton, Manitou, Rocky, Oak, and Raspberry islands.	Same as alternative A; station park staff on Stockton, Raspberry, Outer, Sand, Michigan, and Oak islands.	Relocate mainland employee housing within Little Sand Bay area; develop maintenance operation in Little Sand Bay; move park headquarters in Bayfield to new visitor center; retain maintenance facility in Bayfield; station park staff on Sand, Raspberry, Oak, Manitou, and Stockton islands.	Little Sand Bay actions same as alternative D, except maintain park headquarters in old Bayfield County courthouse and retain Bayfield maintenance facility; station park staff on Sand, Raspberry, Oak, Manitou, Stockton, Rocky, Michigan, and Devils islands.

AFFECTED ENVIRONMENT

NATURAL RESOURCES

Detailed information on the natural resources of Apostle Islands National Lakeshore is presented in the *Environmental Assessment: Natural Resources Inventory and Management* (NPS 1983) and the *Resources Management Plan and Environmental Assessment* (NPS 1986). For the purposes of this document the lakeshore's natural resources are summarized.

TOPOGRAPHY

Apostle Islands National Lakeshore lies along the densely forested south shore of Lake Superior in northern Wisconsin. The topography of the lakeshore varies considerably from the mainland and from island to island, but overall it is gently rolling. Elevations range from 602 feet (approximately mean lake level) to 1,081 feet on Oak Island.

The approximately 150 miles of shoreline within the lakeshore are comprised of sandstone cliffs, high clay banks, and rocky and sand beaches. Wave action and erosion have carved arches, caves, spires, columns, and "windows" in the Lake Superior sandstone. Areas along these shorelines provide spectacular vistas of Lake Superior. The inner islands are the most naturally protected from storms on the lake, while the outer islands bear the brunt of storms.

Land areas are generally covered with dense forest vegetation. Sparsely vegetated cuspate forelands (sandspits), sand and gravel beaches, lagoons, beaver flowages, sphagnum bogs, and marshes are found on many islands. Besides being important wildlife habitats, these areas also often contain unique and fragile plant species.

The Apostle Islands area, including the Chequamegon Bay region, is one of the few Lake Superior coastal areas with sand beaches. The dynamic process of sand accumulation and erosion is quite evident throughout the lakeshore. Twelve of the 21 islands have sandspits, and long sandy beaches are found on the mainland and 15 islands. On several islands these beaches provide the only natural access because of steep sandstone cliffs and clay banks. Most sandspits and beaches provide safe anchorages.

Littoral drift of shoreline sediments nourishes and replenishes these sandy areas. In general, the drift of littoral material (primarily sand) is east to west in the Sand Bay area and north to south in the Red Cliff Bay and Buffalo Bay areas. Some beaches and sandspits continue to grow while others erode, this sequence may reverse over periods of time. Higher and wider beaches are associated with exposures to the higher wave-energy levels of the open lake. Tombolos (sand bars connecting land masses) have been identified on Stockton and York islands (see Outstanding Natural Features map). Tombolos now forming underwater have been identified between York Island and Point Detour and between Sand Island and Sand River. Long Island is an example of an unspoiled barrier spit, which is quite rare on Lake Superior. The shape and perhaps the geographic position of Long Island changes over relatively short periods of geologic time.

Shoreline erosion and human obstructions such as docks have sometimes impeded the natural replenishing process for beaches and sandspits. On several heavily used sandspits, beach vegetation that holds the sand in place is being destroyed. The sandspits on Ironwood, Otter, and York islands were used as ramps during logging operations, which caused massive deterioration of the sandspits and their vegetation.

It is believed that artificial stabilization of water levels in Lake Superior has resulted in some alteration of the natural flux of coastal sands and soils. Lake levels are controlled by the International Joint Commission, and decisions made by this organization are outside the statutory authority of the National Park Service.

GEOLOGY

Lake Superior sandstones, which form the bedrock of the lakeshore, were deposited about 600 million years ago. Quartz is the major constituent of these sedimentary rocks, which are estimated to be more than 22,000 feet thick. The red color is derived from the oxidation of small amounts of iron-bearing materials that lie between the individual grains. Classic sedimentary rock outcrops can generally be seen along the north and northeast shores of the islands and along the lakeshore cliffs on the mainland.

High-quality Lake Superior sandstone, known as brownstone, was a popular building material in the eastern and midwestern United States during the late 1800s, and it was quarried at several locations in the lakeshore. This rock was preferred over granite because it could be readily split along the lines of stratification, so it was easier to work.

After the sandstone was formed, the region was glaciated on at least four occasions, the last advance of glacial ice occurring about 12,000 years ago. Ice movement was from northeast to southwest, and the northeastern edges of islands show evidence of scouring by glacial debris, while glacial deposits are thickest toward the southwestern ends.

Portions of the Bayfield Peninsula were deeply eroded by glaciers, especially the area between the present mainland and Oak, Basswood, and Madeline islands; the area between Madeline, Michigan, and Stockton islands; and the passage between Oak and Stockton islands. By about 11,500 years ago, the last glaciers had retreated, leaving the Apostle Islands in much the form they are now. The earth's crust rebounded as the weight of glacial ice decreased. The amount of rebound is not precisely known.

Since the glacial retreat, the shorelines have been further modified by erosion and deposition. Today wind and waves continue to alter shorelines, eroding clay banks and sandstone cliffs (see Outstanding Natural Features map). On several islands, including Oak, Bear, and Stockton, evidence of ancient shorelines can still be seen.

MINERAL DEPOSITS

The Apostle Islands region has long been regarded as nearly barren of economic deposits of minerals, with the exception of building stone. The once active brownstone quarries are now abandoned, and there is little likelihood of their being reactivated.

The Apostle Islands are part of the Mid-Continental Rift geologic province. There is interest in exploring the rift basin, and a 1984 field study collected information to analyze mineral occurrence and potential in the lakeshore. The only possibility for oil and gas in this area was found to be the Freda sandstone, which is very deep and thus economically unfeasible for exploration at this time. Because potential hydrocarbons beneath the islands are relatively inaccessible, the lakeshore is not a likely target for exploration or extraction activities in the immediate future. No other economic deposits of minerals exist.

SOILS

Soils have not had sufficient time to develop since the last glacial retreat. Generally, no more than the upper 4 feet of surface material have been affected by physical and chemical soil formation processes, resulting in shallow, undeveloped soil profiles.

Soil formation has been affected predominantly by glaciation and lacustrine (lake) sedimentation. Pleistocene glaciers deposited dense layers of red calcareous till, ranging in texture from sandy loam to sandy clay loam and clay. Following glaciation, the region experienced a long period of emergence and submergence by lake waters. During submergence, clay particles suspended in proglacial lakes settled in various places in the Apostle Islands region. As lake levels receded, wave action carved a variety of shoreline features and reworked the original till deposits on which soils have developed.

A comprehensive soil survey for the lakeshore has not yet been done, but the mainland unit and many of the islands (including Basswood, Manitou, Hermit, Stockton, Bear, Raspberry, York, Rocky, Sand, Outer, and Oak) have been surveyed. Of the surveyed areas a wide variety of soils have been identified. Major soil types are identified as follows:

Sandy soils – generally found near beaches, sandspits, and cuspate forelands, and areas where sandstone outcrops occur. These soils are usually well drained and excessively dry. They are easily disturbed and abrasive to vegetation.

Sandy/clay soils – the predominant soil type in the lakeshore. The proportion of sand to clay varies from area to area. A higher sand content results in faster drainage and evaporation; a higher clay content helps make the soils more erosion resistant, and the soils often show a better developed profile with thicker horizons. Sandy/clay soils are generally best suited for development.

Clay soils – generally found throughout the lakeshore. Although clay soils are erosion resistant, they also have much slower percolation rates, depending on the degree of compaction. Once filtration is reduced, excessive runoff sometimes results in increased erosion. Clay soils are very slippery when wet, and they also have shrink-swell tendencies, making them unsuitable for development.

Bog soils – generally found in small, poorly drained areas. These are organic soils of mucks and peats of various depths. They are often waterlogged and are not suitable for development.

VEGETATION

The northern Great Lakes region, including Apostle Islands National Lakeshore, lies between the northern conifer forest immediately to the north of Lake Superior and the temperate deciduous forest to the south. This transitional forest is usually called the northern hardwood/hemlock forest. Devils Island and a few areas of the mainland unit resemble the northern conifer forest. The remainder of the lakeshore is difficult to classify because of past logging, but in pre-disturbance times it probably would have been classified as a variant of the Great Lakes hardwood/hemlock forest.

White pine, white cedar, and hemlock – all significant and declining members of the lakeshore's pre-logged forest – were selectively and heavily cut. They remain greatly

reduced in relative importance, and it appears that only direct management will assist their return in number to the islands and mainland.

Unlogged (i.e., virgin) stands of eastern hemlock grow on Outer, Michigan, and Bear islands (see Outstanding Natural Features map). Such stands are increasingly rare in North America. Even though the Apostle Islands hemlock stands will be managed for preservation and scientific study, they are two to three centuries old, and there are no proved techniques to ensure their regeneration. Experience and study elsewhere in the Great Lakes region suggest that hemlock stands are in a natural decline, and they may disappear unless there is a significant change in the regional climate. There is further evidence to suggest that periodic fire or severe windstorms may be required to produce an effective seedbed for hemlocks.

Other common tree species include sugar maple, yellow birch, white birch, hemlock, white cedar, white pine, red maple, balsam fir, black spruce, tamarack, white spruce, jack pine, and red pine. The shrub layer generally has many saplings of the dominant trees, and the ground cover is usually heavy and complete. Stands of trembling aspen are characteristic of areas of recent disturbance and are common on Oak, Outer, and Stockton islands. Open fields are scattered throughout the islands, often near areas of past and present human habitation.

Colonies of beaver inhabited Stockton, Outer, and Michigan islands sometime after the 1930s, almost certainly as a response to habitats created by loggers. Their impoundments have flooded extensive areas, thus preventing the re-creation of pre-logged forest conditions in drainages on Outer and Stockton islands.

Yew was the dominant ground cover on most of the islands. White-tailed deer, which became extraordinarily abundant in the 1950s, browsed yew to near extinction on several islands; it is probable that direct management will be required to revitalize those populations. Islands that have never had deer populations now support some of the healthiest stands of yew in the United States.

Sand dune vegetation, including the pines, beach grasses, and members of the heath family, dominates the 12 sandspits and three or four tombolos in the national lakeshore. This specialized vegetative community and the immature soil that supports it are extremely sensitive to human traffic. Studies in some of these sand dune communities show that periodic fire is the force that releases bound nutrients and stimulates regeneration of several dune plant species. Current lakeshore policy is to suppress all human- and lightning-caused fires, possibly adversely affecting beach vegetation communities.

Other unique plant communities include sphagnum bogs, which contain a variety of plants, among them pitcher plants, bog laurel, swamp pink, and sundew. Nearly 20 species of orchids can be found throughout the lakeshore. Wildflowers are abundant and can be seen from early May to October.

Most vegetative species planted on farmsteads and around light stations, such as turf grasses, hay, and fruit trees, were not native to the islands. None of these exotic species appear to have assumed any significant ecological role. The persistent exotic purple loosestrife occurs on Long Island. Future plans for the management of this island will address methods to control this exotic.

WILDLIFE

Wildlife species at Apostle Islands are characteristic of the northern hardwood/hemlock and the boreal forest ecosystems (see table 12). Numbers, species, and distribution vary between the mainland and the islands. Many larger islands contain diverse habitat that supports or has the potential to support various mainland species. With vegetative succession, wildlife species and numbers will also change and fluctuate.

Table 12: Selected Wildlife Species, Apostle Islands National Lakeshore

Mammals

bats
- big brown
- keen
- little brown
- hoary
- red
- silver-haired

bear, black
beaver
chipmunks
- eastern
- least

coyote
deer, white-tailed
fisher
fox, red
hare, snowshoe
lemming, bog
mink
mole, star-nosed
mice
- house
- meadow jumping
- woodland deer
- woodland jumping

muskrat
otter
porcupine
shrews
- masked
- pygmy
- saddleback
- water

skunk, striped
squirrel, red
voles
- meadow
- red-backed

weasels
- long-tailed
- short-tailed

Birds

blackbird, red-winged
chickadee
cormorant, double-crested
finch, northern
gulls
- herring
- ring-billed

hawks
- broad-winged
- marsh (harrier)
- rough-legged
- red-tailed
- sharp-shinned

heron, great blue
jay, blue
kestrel (sparrow hawk)
loon, common
mergansers
- common
- red-breasted

nuthatch
ovenbird
raven
redstart, American
sapsucker, yellow-bellied
sparrows
- song
- white-throated

warbler, black-and-white
woodpecker

Travel between the mainland and the islands is limited to certain species at certain times of the year. Black bears and white-tailed deer, the largest mammals in the lakeshore, are occasionally seen swimming between the mainland and the islands. Other animals may do so as well. In winter, ice bridges between the mainland and islands sometimes allow nonhibernating wildlife the opportunity to move between the islands. Otherwise, the lake is a barrier to inter-island wildlife movements.

Hunting, trapping, and fishing (both commercial and sport fishing) are permitted in the lakeshore under the legislation that established the lakeshore (PL 91-424). Deer hunting is limited to the mainland and to an annual-muzzle loaders black-powder deer hunt on Basswood and Oak islands. Trapping is allowed throughout the lakeshore, but has not been practiced on the islands in recent years.

A reproducing population of black bears established itself on Stockton Island in the early 1980s. There has been insufficient study to determine the longevity of the population, but at current productivity there could be more than 30 bears on Stockton within a few years. If that population density was realized, there could be dangerous interactions between bears and island visitors. It is not known if other islands, or the mainland, have the habitat and resources to support reproducing populations of bears.

White-tailed deer were rare on the Apostle Islands before the 1940s. The deer population on several islands proliferated in the 1950s, and then declined dramatically in the 1960s.

The only deer remaining are on Oak, Stockton, and Basswood. It is likely that the island forests are now too mature to sustain more than a few reproducing deer.

The mainland unit of the national lakeshore is not productive deer habitat, except for the winter deer yarding area at Sand Point. That yard, like most winter yards in the northern Great Lakes region, is overbrowsed. As a result, the impressive stand of white cedar at Sand Point is not able to produce young trees.

The only persistent colonies of beaver within the national lakeshore are on Stockton and Outer islands. These colonies, which have altered most of the two islands' drainages and large areas of forest vegetation, may be declining in productivity as the quantity and quality of their foods are reduced. Because beaver invaded the islands as a response to logging, the National Park Service may elect to hasten the natural decline in beaver productivity through trapping and to restore the original drainages of Stockton and Outer islands.

The Apostle Islands attract an extraordinary variety of migratory and nesting birds. The mixed-forest ecosystem (northern hardwood/hemlock) provides habitat for many nesting bird species. Additionally, the islands are on a major flight path for spring and fall bird migrations. Because Lake Superior is so large, many migrating bird species that are reluctant to fly over open water find more suitable routes to cross the lake. The Bayfield Peninsula and the Apostle Islands provide a suitable area for migrating birds to concentrate, as well as a resting/staging area before and after lake crossings.

Nesting colonial birds, including the herring gull, great blue heron, and double-crested cormorant, are given special protection in the lakeshore. Eagle and Gull islands and areas on Otter, Long, and Hermit islands are important nesting grounds (see Outstanding Natural Features map). Eagle and Gull islands support more than three-fourths of all breeding pairs of herring gulls in the Wisconsin portion of Lake Superior. Visits to Eagle and Gull islands, as well as to the northern and northwestern areas of Otter, are restricted during the nesting periods, May through September. Eagle Island has the only large rookery within the lakeshore for great blue herons.

Also nesting in the lakeshore is the merlin (*Falco columbarius*), a species in the "watch" category on the *Wisconsin State Threatened and Endangered Species List*. Two pairs of merlins were known to establish nests in 1987, with one pair successfully producing fledglings. Sandspits and beaches are important areas for some species of nesting and migratory shorebirds. Visitor use of certain popular areas may be restricted in the future to protect nesting habitat.

Fish species are characteristic for waters of good quality (Lake Superior's water quality is considered relatively pristine). The littoral zone around all the islands and along the mainland unit is an area that is intensively used for spawning by several reef (shoal) spawning native species such as lake trout and whitefish. Degradation of water quality over or near these spawning grounds could have negative effects on spawning success. Native fish species include lake trout, Menominee whitefish, and lake herring, and exotic species include smelt, brown trout, and rainbow trout. Atlantic, coho, pink, and chinook salmon have recently been introduced into Lake Superior. Of these, coho and chinook salmon are found throughout the Apostle Islands. Many streams on the peninsula are popular with fishermen seeking rainbow and brown trout.

The full range of extirpated species in the Apostle Islands region is not well known. Moose and pine marten no longer inhabit the mainland area. The diverse habitats on many of the larger islands support or have the potential to support many wildlife species

found on the mainland. As forest vegetation changes as a result of fire frequency and other factors that cause successional changes, so too will the wildlife species and numbers inhabiting the islands.

THREATENED OR ENDANGERED SPECIES

Thirteen plant and nine animal species known to inhabit Apostle Islands National Lakeshore are on the *Wisconsin State Threatened and Endangered Species List* (see appendix G).

The gray wolf (*Canis lupus lycaon*), officially listed as endangered in Wisconsin by the U.S. Fish and Wildlife Service, reestablished territories in northern Wisconsin beginning in the 1970s with pioneers from northern Minnesota packs. It is conceivable that some individuals occasionally visit the mainland unit of the lakeshore. The islands do not have a sufficient prey base (primarily white-tailed deer) to support a wolf pack, but wintering deer on the mainland could be a significant source of prey. However, the Wisconsin state wolf recovery team believe that a road-density of greater than 1-linear mile per square mile of landscape will lead to excessive, illegal shooting of wolves by humans, and thus prevent the establishment of packs. Road-density in and adjacent to the mainland unit of the national lakeshore does exceed 1.0 mile per square mile.

Threatened or endangered bird species that have been listed by the state or federal government and that are known to use areas within the lakeshore include the threatened (endangered on the state list) bald eagle (*Haliaeetus leucocephalus*) and the endangered American peregrine falcon (*Falco peregrinus anatum*), arctic peregrine falcon (*Falco peregrinus tundrius*), and piping plover (*Charadrius melodus circumcinctus*). Bald eagles nest in the lakeshore, and piping plovers did so historically. The lakeshore is within the transcontinental range of the peregrine falcon; however, no recent nestings in the lakeshore have been documented.

Bald eagle populations have declined throughout the contiguous United States during this century. The reasons for this decline are not well understood. Primary factors include the loss of suitable habitat from increased human development; mortality from shooting, trauma, poisoning, disease, and electrocution; and reduced reproduction success as a result of environmental contaminants.

Before DDT and other organochlorines were introduced to aquatic food chains, a pair of bald eagles inhabited every 5 to 10 miles of the Great Lakes' shoreline, including the shorelines of the Apostle Islands. At least 13 of the 21 islands now within the national lakeshore were active nesting territories. By the early 1970s nesting eagles were gone from the Apostle Islands, as well as most of the Great Lakes basins. An active eagle nest was located on Michigan Island in 1981. By 1987, the number of nesting pairs within the lakeshore had increased to five, and four young were produced. However, nest-failures probably exceed reproductive successes. Analyses of eagle tissues have revealed extraordinary concentrations of toxins, including DDT, dieldrin, PCB, and mercury. Large-scale studies are required to determine the origin of toxic chemicals now moving through the Apostle Islands food chains.

At present, human disturbance of bald eagles in the lakeshore appears to be minimal. Eagles are most sensitive to disturbances during the critical periods of breeding, incubation, and early hatching (March through mid-June). Due to the proximity of eagle nests to water, eagles can be disturbed by boating traffic. Disturbances from off-trail hikers is not a problem because the dense forest vegetation discourages this activity.

The *Northern States Bald Eagle Recovery Plan*, which was prepared by an interagency recovery team in 1983, describes recovery tasks for monitoring bald eagle population trends and habitat status; for determining minimum population and habitat needs to increase reproduction and reduce mortality; and for encouraging communication among agencies with management responsibility for eagles. The protection of bald eagles and other threatened or endangered species is a top priority in the lakeshore, and management practices will continue to comply with the policies and objectives of the bald eagle recovery plan. All proposed general management actions with potential for negative impacts on bald eagles or their essential habitat will continue to be coordinated with the U.S. Fish and Wildlife Service.

Within the lakeshore the endangered piping plover historically nested only on Long Island, and this island is currently the only site in Wisconsin where this species breeds. A major ecological study of this species by a federally sponsored research team was initiated in 1987 and will continue at least through 1988, and the significance of Long Island as piping plover habitat will be studied specifically. Habitat on Long Island is deteriorating because dunes have stabilized, and vegetation is encroaching on breeding areas. Other threats include human disturbances. The full extent of these and other impacts is not well known. Following ecological studies of this island, a detailed plan will be prepared to manage and protect this nesting habitat. As discussed previously, all proposed general management activities that would potentially impact the piping plover will be coordinated with the U.S. Fish and Wildlife Service, in accordance with section 7(c) of the Endangered Species Act of 1973, as amended. The lakeshore will also comply with the provisions of the *Great Lakes and Northern Great Plains Piping Plover Recovery Plan* (U.S. Fish and Wildlife Service 1988).

The lakeshore contains no federally listed threatened or endangered plant species.

In accordance with section 7(c) of the Endangered Species Act of 1973, as amended, a biological assessment for the above-listed threatened and endangered species is required. This environmental assessment will serve as the biological assessment for potential impacts on these species.

AIR QUALITY

Even though the Apostle Islands are relatively isolated, they may be affected by airborne pollutants. A coal-fired power plant in Ashland, Wisconsin, some 20 miles south-southwest of the lakeshore, and the industrial complexes of Duluth, approximately 70 miles west, are the nearest sources of pollution. Pollutants may also be carried from midwestern and western industrial centers. Apostle Islands National Lakeshore is a class II area for air quality.

The temporary wet-fall air quality monitoring site on Outer Island has been removed, and the park staff is considering the establishment of a permanent air quality monitoring site within the lakeshore. Over the last several years, pH levels at the monitoring station averaged 4.6 to 4.8, while the average for the Great Lakes area is 4.8. Other data collection points within the region include wet- and dry-fall collectors at Isle Royale National Park and in Duluth. Even though the requirements of Wisconsin Act 296 on acid rain are not relevant to the alternatives considered, the National Park Service will continue to cooperate with the state of Wisconsin in every possible way.

WATER RESOURCES

Lake Superior has the largest surface area of any freshwater lake in the world, encompassing an area of about 31,652 square miles. Its volume of 2,935 cubic miles is second only to Lake Baikal in Siberia. Overall, current movement in Lake Superior is counterclockwise around the periphery of the basin. Major cyclonic eddies occur in the Duluth / Silver Bay / Apostle Islands region. Within the Apostle Islands group, the surface current is largely controlled by wind. Winds off Michigan Island from about east-northeast to due west characteristically produce the highest and most damaging waves. Winter ice conditions vary with temperature, snowfall, and wind. Freeze-up normally occurs in January and continues into March.

The waters of Lake Superior have historically been significant for commercial and sport fishing. Bacteriological water quality is considered excellent, but some contamination has occurred and continues to occur because of deposition from acid rain, PCBs, DDT, and other pollutants such as heavy metals. Minor deterioration of water quality occurs near harbors and marinas from boat exhaust and petrochemical spillage. Water transparency in the Apostle Islands is somewhat lower than that observed in other nearshore areas of Lake Superior.

Many islands with designated camping do not have toilet facilities, and many of these campsites are on beaches and sandspits with well-drained soils. Although it has not been studied, there is high potential for human wastes to enter surface and subsurface water resources.

Two perennial streams, Sand River and Saxine Creek, drain the mainland section of the lakeshore. Small lakes formed by barrier beaches are found at Little Sand Bay and on Stockton, Michigan, and Outer islands. Beaver dams have created ponds on Outer and Stockton islands.

There are no federal or state designated wild or scenic rivers within the lakeshore boundaries.

The requirements of Wisconsin's surface water quality standards (Administrative Code NR 102) are not relevant to the alternatives being considered; however, the National Park Service will continue to cooperate with the state of Wisconsin in every way possible.

WETLANDS

Natural resource inventories of vegetative communities have identified wetlands on Stockton, Michigan, and Outer islands. Boglike lagoons are common on inland areas of most of the lakeshore's sandspits and barrier beaches. The construction of docks, boardwalks, or other facilities in or adjacent to wetland areas will require detailed studies to ensure minimal long-term impacts to wetland ecosystems.

PRIME OR UNIQUE AGRICULTURAL LANDS

There are no prime or unique agricultural lands within the boundaries of Apostle Islands National Lakeshore.

FLOODPLAINS

Only Bayfield County has been surveyed and mapped for flood hazard boundaries. None of the proposed lakeshore development sites within Bayfield County are in flood hazard areas. Information is unavailable for Ashland County. Designs for new construction in the Ashland County portion of the lakeshore will consider potential flood hazards in these unmapped areas. There is potential for flooding along Sand River and Saxine Creek.

Because of Lake Superior's large surface area and restricted outlets, the lake responds slowly to changes in precipitation, runoff, and evaporation rates and to human efforts to control or divert flows. The combination of high water levels and storm-generated wave action creates the potential for considerable flood damage to buildings, docks, and other shoreline structures.

COASTAL ZONE MANAGEMENT

The Coastal Zone Management Act of 1972 requires that all federal activities significantly affecting the coastal zone be consistent with the state's approved coastal zone management program. Wisconsin's program received federal approval in 1978. The goal of the state program is "to preserve, protect, develop, and where possible, to restore or enhance the resources of Wisconsin's coastal area for this and succeeding generations." The establishing legislation for Apostle Islands states the purpose of the lakeshore is "to conserve and develop for the benefit, inspiration, education, recreational use, and enjoyment of the public certain significant islands and shoreline . . . and their related geographic, scenic, and scientific values." Because the goals of Wisconsin and the National Park Service are similar, actions proposed by the general management plan for Apostle Islands National Lakeshore are consistent with the regulations and policies described in the *Wisconsin Coastal Management Program for the Great Lakes, 1987 Update*, which was adopted July 9, 1987, by the Coastal Management Council.

CULTURAL RESOURCES

The cultural resources of Apostle Islands National Lakeshore are the sites, structures, objects, and landscapes associated with human use and occupation of the archipelago from prehistoric times to the recent past. Historical themes represented by these resources include aboriginal cultures, early European contact (fur trade, military, and missionary activities), permanent white settlement (including shipping, commercial fishing, agriculture, brownstone quarrying, logging, and tourism), and modern Chippewa life and culture.

The cultural history of the Apostle Islands is also representative of the history of the whole Lake Superior region. The island setting resulted in special patterns of use and development, and it contributed to the excellent state of preservation of early homesteads, logging camps, and quarry operations. Because access has always been difficult, island sites have escaped both the development and looting that have destroyed or damaged similar sites on the mainland throughout the northern Great Lake states.

RESOURCE DESCRIPTION AND SIGNIFICANCE

Some 37 aboriginal archeological sites on the Apostle Islands appear to be associated with the prehistoric Woodland and early historic periods. Within this broad time span (ca. 600 B.C. to A.D. 1760), numerous small groups appear to have used the Apostle Islands area for a variety of activities. Most of the known sites within the national lakeshore apparently represent short-term uses, such as seasonal fishing and hunting camps. Other activities also occurred at these sites, including food gathering and collecting and processing raw materials for stone tool and ceramic manufacture.

When French fur traders landed on the shores of Chequamegon Bay in 1659, the region was already a crossroads for various groups of Indians, who were being affected by the politics of trade alliances between Indians and Europeans to the east. Because of the islands' strategic location on the lake and natural advantages for defense, French trappers established a post at La Pointe that became a key to their political power on Lake Superior and to the expansion of their fur trade to the west.

The ancestors of the modern Chippewa were among several aboriginal groups historically documented to have moved to Chequamegon Bay area from the east during the late 1600s. Chippewa oral history suggests a somewhat earlier date for their entry into the area. The Chippewa, thought to have formed through the coalescence of several closely related Algonkian groups during the late 1600s, quickly became the dominant aboriginal group in the region. They played an extremely important role in the La Pointe fur trade.

The fur trade continued into the early 1800s, with the French fur-trading post at La Pointe changing to British and then to American hands. When furs became scarce and fashions changed, the American Fur Company carried on a commercial fishing operation on Lake Superior, with La Pointe being the central office and shipping point. Early records show warehouses or fishing stations were located on Stockton and Ironwood islands and at Chequamegon Point (on Long Island). Initial success was followed by a sudden decline when a national economic panic left company warehouses filled with barrels of rotting fish. By 1847 the American Fur Company had closed its doors.

The 1850s were a decade of transition. The United States entered into a treaty with the La Pointe Chippewa Indians on Madeline Island in 1854, dividing the people into the Red

Cliff and Bad River bands and assigning them lands on the mainland to the west and south of La Pointe, respectively. (A portion of the Red Cliff reservation lies within the mainland unit of the lakeshore.) The Chippewa consider Madeline Island as their tribal home, and for nearly 300 years they have used the Apostle Islands for fishing, hunting, trapping, harvesting herbs and berries, and collecting sap to produce maple sugar.)

During the 1850s the Soo Locks were constructed at the east end of the lake. Prospects for trans-Great Lakes shipping, combined with the promising results of early mineral explorations on Lake Superior, led to a period of speculation by surveyors, prospectors, and promoters throughout the region. When the locks opened in 1855, development followed quickly. The towns of Bayfield and Ashland were established, and grandiose plans were made for shipping and industry.

During the 1860s island resources were tapped to supply local demands: lumber for construction, cordwood for steamship fuel, fish for local markets. By the 1870s the Apostle Islands had become part of the regional economy. Milwaukee investors opened the region's first brownstone quarry on Basswood Island, and N. & F. Boutin Company relocated its commercial fishery from Two Rivers, Wisconsin, to Bayfield. The lumber industry also expanded its markets so that when the railroad finally reached Chequamegon Bay in the 1880s, fisheries, quarries, and sawmills multiplied to supply markets throughout the Midwest and the Great Lakes region.

The economic boom continued through the 1890s and into the early 20th century, when brownstone fell out of fashion and the pine and quality hardwoods were depleted. Although there were times of scarcity, the fishery industry continued to provide a reliable economic base until 1960, when commercial harvest was no longer economically viable because of a combination of overfishing and predation by exotic species.

The era of capital and resource exploitation on the islands is represented by the four abandoned brownstone quarries, by tools and rusting machinery, and by dozens of logging campsites, roads, railroad beds, and landings. The most visible and picturesque evidence of commercial activity is the group of six light stations built between 1852 and 1892. Less visible are the offshore shipwrecks. Several wrecks are known from historical records, but only a handful have been located within the lakeshore.

There was also a domestic side to life on the Apostle Islands, as evidenced by odd pieces of machinery and crumbling foundations on several islands. On Sand Island a small settlement developed around the 1870s homestead of Francis Shaw. By the turn of the century the community had a school and post office. Farming, augmented by fishing, continued on the island into the 1920s. During the summer, a second community flourished on the island and was comprised of several wealthy St. Paul families who built cottages along the south shore. For a time in the 1890s Camp Stella offered tourists an island adventure complete with wall tents, outdoor cooking, and Chatauqua-like programs. Two structures remain from the Camp Stella era, as do several buildings from the Shaw farm. The log buildings of the Noring farm have fallen to ruin, and the hayfields have grown in. But the style of life on this active, Norwegian homestead is still visible to the perceptive observer.

There was also a strong domestic aspect to commercial fishing. Several large companies operated in the Apostle Islands, but many fishermen remained independent, selling to one of the companies or, in the case of the Hokenson brothers, directly to a distributor. During fishing season, independent fishermen usually worked out of an island camp, such as the fishing enclaves at Rocky or Stockton Island. Often their families moved to the islands with them to help mend nets and tend gear, grow fruits and vegetables, and

cook and preserve food. The ruins of several camps are evident in the lakeshore. One camp on Rocky Island continues in use; another on Manitou Island has been restored and is a featured tour boat stop. The Hokenson brothers operated from the mainland at their family fishery in Little Sand Bay. Their fishing boat, the *Twilite*, and fishery buildings, including the original furnishings, have been restored as interpretive exhibits.

Although fishing carried the region through hard times that followed the collapse of the lumber industry and again during the Great Depression, the resource is not adequate to economically support the region in the future. By the 1960s the visible scars of logging had healed on the islands and around the bay, as had the raw marks of industry in neighboring communities. Today, recreation and tourism are the basis of the region's future economic development. The cultural resources preserved within the lakeshore are proving to be important keys to this development.

RESOURCE CONDITION AND USE

The Outstanding Cultural Resources map shows the location of the lakeshore's primary resources. The following sites are listed on the National Register of Historic Places.

Shaw Farm – the first permanent settlement on Sand Island. It consists of the Shaw cabin/post office, icehouse, smokehouse, workshop, and the Burt Hill log cabin. The buildings were constructed between 1870 and 1900.

Hadland Fishing Camp – on Rocky Island. This camp contains five buildings and related structures built in 1938, representing the last working fishing camp within the boundaries of the lakeshore.

Hokenson Brothers Fishery – three buildings, a dock, and a boat (the *Twilite*) in Little Sand Bay. The structures were built in the late 1920s and represent an intact fishing and packing operation.

Manitou Camp – five buildings and related structures, a dock, boat landing apparatus, and a small garden clearing. The first structure was built in the 1890s, and the others were added between the early 1900s and the late 1930s. The camp represents a rugged aspect of commercial fishing practiced in this area and one not found in other surviving island camps, namely, winter fishing – both open water herring fishing and gill netting through the ice.

Apostle Islands Light Stations – six building complexes on approximately 34 acres total. The stations are located in a distinct archipelago around the outer islands. The westernmost station on Sand Island is approximately 25 miles from the easternmost station on Outer Island. The Devils Island station is the farthest north and is approximately 24 miles from the southernmost station on Long Island. The light stations, and the dates of construction, are listed below:

Michigan Island (1857)
Raspberry Island (1862)
Outer Island (1874)
Sand Island (1881)
Devils Island (1891)
Long Island (1896-97) – includes the La Pointe and Chequamegon Point light towers

Sevona cottage – built by Sam Fifield in 1905-06. This is a 1-1/2 story building with all four walls built from the hatchcovers of the sunken ship, the *Sevona.* It is part of Camp Stella on Sand Island. It is under a use-and-occupancy agreement and is in fair condition.

Bass Island Brownstone Company quarry – near the southeastern tip of Basswood Island. The opening of the quarry in 1868 signaled the beginning of the brownstone industry in northern Wisconsin. The small quarry on Basswood Island and the quarries on Hermit and Stockton islands are eligible for listing on the National Register of Historic Places.

Archeological sites P-Flat (Manitou Island) and Morty (Stockton Island) – contact-period sites reflecting proto-Ojibwa and proto-Siouan cultures, respectively. Both sites were seasonal camps. The Morty site is on the National Register; the P-Flat site has been nominated but not yet officially listed.

In addition to these sites, one archeological site (Trout Point) and the three other brownstone quarries in the national lakeshore are eligible for National Register listing.

Light Stations

Five of the six light stations in the lakeshore have received stabilization and exterior preservation work. These are open to visitors and serve as quarters for employees on the islands. The Raspberry Island station has been partially restored, and the historic gardens have been reconstructed. Plans call for part of the lighthouse interiors to be refurnished. This station is a focus for interpretive programs. The sixth station is the La Pointe light on Long Island. The lighthouse is in fair condition; the nonhistoric keeper's quarters are in poor condition. The use for this station has not been determined. All stations have active lights, which are maintained by the U.S. Coast Guard. The National Park Service manages the stations under an agreement with the Coast Guard.

Fishing Sites

The Hokenson Brothers Fishery in Little Sand Bay has been restored for visitor interpretation. The fish camp on Manitou Island has undergone extensive stabilization and restoration work. It is open to visitors, and an interpreter lives on site. The Hadland fish camp on Rocky Island is under a use-and-occupancy agreement and is still used by the Hadlands as a summer fishing camp. It is in fair condition.

Brownstone Quarries

Four relict brownstone quarries are within the lakeshore. The Bass Island Brownstone Company quarry on Basswood Island (listed on the National Register) and the smaller Breckinridge quarry are accessible by trail. The Excelsior Brownstone Company quarry on Hermit Island has no developed access; but vegetation has been cleared from the quarry opening so that the site can be viewed from the water. At Stockton Island a trail has been developed from the Quarry Bay campground to the Ashland Brownstone Company quarry, and an interpretive sign has been installed.

Farm Sites

The Shaw farm on Sand Island (listed on the National Register) is under a use-and-occupancy agreement and is in fair condition. The McCloud-Brigham farm site on Basswood Island is a feature on the island's loop trail. No interpretation is done at the site. Other farm clearings, including the Noring farm on Sand Island, the Rudd farm on Basswood Island, and the Bruder farm on Hermit Island, are undeveloped and unmaintained.

Logging Sites

Logging camps and clearings serve as landings and campgrounds on Oak, Passwood, Otter, and Stockton islands. The Trout Point logging camp on Stockton Island is a destination point for a major trail. No interpretation is done at the site; campsites have been designated on the edge of the clearing. The Outer Island trail passes through the 1920s Schroeder Lumber Company railroad camp. No interpretation is done at logging sites, nor are these sites maintained unless they serve as campgrounds.

Underwater Cultural Resources

The lakeshore has extensive underwater cultural resources ranging from possibly prehistoric remains to ship and boat wrecks, massive cribworks related to historic quarrying and logging enterprises, and unnumbered objects from light stations, farms, fishing camps, logging and quarrying sites, and other boat landings. Because the water in Lake Superior is very cold and clean, objects remain well preserved for long periods. In calm weather objects are visible from the surface to a depth of 20 feet. Well over 50 underwater sites exist within the lakeshore. These resources have high potential for yielding information about land sites to which they may be related and for providing clues to unique industrial and lifestyle adaptations on the islands. These resources also have great potential for interpretive use. However, recreational divers are increasingly more active within the lakeshore boundaries, and there is some evidence that objects are being removed from the waters.

Winter storms often scour sands from around submerged cultural resources, revealing them to divers after the spring ice melt. The efforts to protect these resources are currently hampered by the fact that the state of Wisconsin owns the lakebed, and the National Park Service only controls access to these sites to a limited extent. No agreement exists as to the management and protection responsibilities for these resources between the state and the Park Service. Another concern with these resources is that changing water levels of Lake Superior could place the submerged resources on dry land, which could hasten their deterioration.

SOCIOECONOMIC ENVIRONMENT

REGIONAL LAND USE

Land use on the Bayfield Peninsula adjacent to Apostle Islands National Lakeshore is primarily timber growth, with scattered residential uses. There are no concentrated development areas, and there is little agricultural use. The adjoining lands are about 40 percent private, 30 percent county, and 30 percent Red Cliff Chippewa tribal land.

Local zoning ordinances are not strongly dedicated to protecting the national lakeshore's resource values. Much of the private land adjoining the lakeshore is owned by large paper companies who plan to harvest pulpwood timber. Other private land will also be logged. The county lands are to a large extent forest croplands and are scheduled to be cut by type. The Tribal Conservation Code is still being formulated, and tribal land use has not yet been determined. To date, campgrounds and residential uses have been established on tribal lands adjacent to the lakeshore. The tribe has long-range plans to develop lands for recreation and tourism.

Logging and commercial fishing are major industries in the Bayfield region; commercial fishing is also the Red Cliff Chippewa's primary industry. Sportfishing, boating, and water-based activities are other common uses of Lake Superior.

LOCAL ECONOMY

Bayfield County

Bayfield County, which includes the Bayfield Peninsula and four of the Apostle Islands, is sparsely settled. The population is largely scattered in rural, nonfarming residences. Washburn with a population of 2,000 and Bayfield with a population of 743 (1980 census) are the county's largest cities. Bayfield County has been characterized by a high rate of out-migration, generally among younger people who leave the area for educational and employment opportunities elsewhere. However, the population stabilized in the mid-1970s and has been showing slight increases. State forecasts expect a growth in northern rural counties with a recreation-related economic base of as much as 30 percent from 1980 to 2000.

The most important industries in Bayfield County are manufacturing, professional and related services, and wholesale/retail trade. A greater proportion of people are employed in the agricultural, forestry, fishing, and construction fields than in the state as a whole.

Relative to the United States or the state of Wisconsin, family income in Bayfield County is low. However, care must be taken in interpreting raw income data for a rural area like Bayfield County because fewer family members may be employed outside the home, resulting in a lower family income. Income reported by self-employed people may not reflect capital accumulation and additions to net worth as a result of appreciation or debt reduction. In a broader sense, the appreciation of the uncrowded natural amenities is an important part of the lifestyle for regional residents. These are real values not captured in statistical income measurements.

Bayfield provides a fishing village atmosphere where tourists spend time browsing the many shops featuring quality artwork by local artisans. Other activities include fishing, boating, boat cruises, camping, and general sight-seeing. Several fine restaurants and

lodging accommodations are also available. Historically, Bayfield was the gateway to the Apostle Islands during the late 1800s and early 1900s when logging, fishing, and mining boomed. A portion of the city of Bayfield is designated as a historic district and is on the National Register of Historic Places. The area exemplifies a typical northern Wisconsin lumbering and fishing community.

The mainland area of Apostle Islands National Lakeshore is partially within the boundaries of the Red Cliff reservation. Approximately 1,120 Chippewa live in the Bayfield/Red Cliff area. The tribe operates one campground, an arts and crafts center, the Buffalo Bay docking facility, and a commercial fishing enterprise. Future plans include the development of family-oriented recreational facilities.

Ashland County

Ashland County, which includes the other 17 of the Apostle Islands in the national lakeshore, is east of Bayfield County. The county had a population of 16,783 in the 1980 census, and it is sparsely settled. Ashland is experiencing a leveling-off in a trend of population decline that started in the 1960s, and recently there have been significant increases in local residents, particularly in the rural townships.

The economic base for the county is its natural resources. Agriculture engages a large percentage of the labor force. The principal manufacturers process farm and forest products, and pulpwood is shipped by rail to mills in southeastern Wisconsin. Service-oriented employment is proportionately large, reflecting that Ashland is a regional shopping service area.

The city of Ashland has a population of about 9,115 (1980 census). It was established as a port town in the late 1870s and quickly became a major commercial shipping and rail center. The population and work force have diverse labor skills, cultural perspectives, and educational backgrounds. Among the sites in the city of Ashland that are on the National Register of Historic Places are the old Ashland post office (1893) and the Security Savings Bank (1893).

Madeline Island, the largest of the Apostle Islands, can be visited by ferry or private boat. During summer tourists camp, hike, golf, fish, boat, and shop. Restaurants and lodging accommodations are also available. The island is inhabited year-round, and the Red Cliff and Bad River bands of the Lake Superior Chippewa consider it their homeland.

The Bad River Band is one of the major employers (1987) in the Ashland area and has 100-150 people on its payroll. The Bad River reservation in Ashland County totals about 8,608 acres and is one of the most significant wildlife areas in the Great Lakes region. A slough on the reservation provides acres of wild rice that has long been an important food and is intensively harvested as a cash crop. The reservation is owned, operated, and managed by the tribal council. The general public has access to public parking areas, nature trails, interpretive exhibits, and an observation tower for viewing wildlife.

In addition to the influence of the Chippewa Indians, the cultural influence of other native American communities in the region adds diversity to the music and arts environment of Ashland County.

Economic Future

Northern Wisconsin has been troubled economically for some time because regional growth and economic vitality have been constrained by relatively high levels of unemployment. Various local, state, and federal agencies that have studied the region's dilemma and growth potential have concluded that tourism and outdoor recreation offer the best potential for economic improvement and employment.

For the tourist market in the Bayfield region to expand, private enterprise oriented toward a broader segment of the total potential market will have to be developed. The winter sports market is one segment of the economy that has been heavily emphasized, and there has been a significant increase in recent years.

There is a noticeable increase in new construction and capital improvements in Ashland. This city is becoming an economic center because of industrial development, the proximity of Apostle Islands National Lakeshore, and tourism associated with the area's scenic beauty and rich natural and cultural resources.

REGIONAL RECREATION RESOURCES AND USES

The upper Great Lakes region offers a wide range of recreational opportunities, including hiking, camping, sailing, canoeing, fishing, hunting, nature study, and numerous winter activities. Besides Apostle Islands National Lakeshore, other national park system areas on Lake Superior include Pictured Rocks National Lakeshore on the northern shore of Michigan's Upper Peninsula, Isle Royale National Park in the western part of the lake, and Grand Portage National Monument on the northwestern shore. Nearby areas include Voyageurs National Park and the Boundary Waters Canoe Area Wilderness in northern Minnesota. To the south and west near St. Paul is St. Croix National Scenic Riverway. On Lake Michigan are Sleeping Bear Dunes National Lakeshore on Michigan's Lower Peninsula and Indiana Dunes National Lakeshore near Gary, Indiana. Ice Age National Scientific Reserve is in south-central Wisconsin. Chequamegon National Forest is about 20 miles southwest of the lakeshore, and numerous state parks are found within a 200-mile radius. Major skiing facilities have been developed in four Wisconsin counties bordering Lake Superior. The Lake Superior Circle Route is a highly publicized international route around Lake Superior, and it provides access to recreation areas in Minnesota, Wisconsin, and the province of Ontario, Canada (see Region map).

Apostle Islands National Lakeshore is unique among the recreation areas in the Great Lakes region because of its 21 islands. This is a wild, remote part of the great northwoods country that is being constantly shaped by Lake Superior. The Apostle Islands are considered one of the finest areas for sailing on Lake Superior because of the protection afforded by the islands.

ACCESS AND TRANSPORTATION

Road access to the lakeshore is from either the south or west by way of Wisconsin Highway 13. Access to Little Sand Bay is over several miles of poorly maintained roads, which discourages many visitors. Because local roads are owned by the townships, the National Park Service currently has no authority to make or fund improvements.

Public transportation to the islands is provided by Water Taxi, Inc., and Apostle Islands Outfitters, Inc., both of which have concession contracts with the National Park Service. Water Taxi has a 4-1/2-year contract (due to expire in 1992) to provide unscheduled shuttle service. The operation has one boat that carries a maximum of six passengers per trip. Apostle Islands Outfitters has a contract to provide scheduled tours of the islands. The tour season begins in early June and terminates in late August, with unscheduled cruises on demand before and after the regular season. This concessioner has three years remaining after the 1988 season on its 10-year contract. Two vessels were used during the 1988 season – the *Island Princess*, a 150-passenger vessel that operates at a speed of 18 to 20 miles per hour, and the *Sea Queen*, a 49-passenger vessel that operates at 11 miles per hour. The following cruises were scheduled in 1988:

The Grand Tour – Daily morning and afternoon trips around Devils Island on the *Island Princess* (June 4 – Sept. 30)

The Inner Island Shuttle – Monday, Wednesday, and Friday afternoon trips to Raspberry and Manitou islands on the *Sea Queen* (June 30 – August 27)

The Stockton/Manitou Shuttle – Tuesday, Thursday, Saturday, and Sunday afternoon trips on the *Sea Queen* (June 30 – August 27)

Ridership on the cruise ships has remained quite stable over the past 11 years and has averaged approximately 15,830 passengers per year. The *Chippewa* and *Islander* were taken out of service in June 1987 when the larger and faster *Manitou* was put into service. In April 1988 the *Manitou* was replaced by the *Island Princess*, which has similar operating characteristics.

The highest ridership occurred in 1983, when there were 21,311 passengers because of the exceptionally good weather (lack of rain). Generally, boats operate about 100 to 120 days a year (depending on weather). Breakdowns and perhaps the limited lodging and parking available in Bayfield also limit ridership.

Table 13 shows the number of trips, average number of passengers carried on boats, and the occupancy of the vessels from 1983 through 1987. In 1985, 1986, and 1987, the concessioner ran fewer trips than in previous years. The occupancy rate per trip increased from 1984 to 1985 for all three vessels. In 1986 the occupancy on the *Islander* continued to increase, and decreases were recorded for the *Chippewa* and the *Sea Queen*. In 1987 ridership occupancy on the *Sea Queen* amounted to nearly 70 percent and the *Manitou* recorded a 33 percent occupancy.

Table 13: Concessioner Boat Trips and Passengers, 1983-87

	1983				1984			
	Chippewa	*Islander*	*Sea Queen*	Total	*Chippewa*	*Islander*	*Sea Queen*	Total
Number of Trips	100	196	117	413	101	187	114	402
Number of Passengers	5,797	12,918	2,596	21,311	5,152	8,161	2,590	15,903
Percentage of	27.2	60.6	12.2		32.4	51.3	16.2	
Average Trip Load	57.8	117.4	22.2		51.0	43.6	22.7	
Percentage of Occupancy	55.0	106.7	45.3		48.6	39.6	46.3	

	1985				1986			
	Chippewa	*Islander*	*Sea Queen*	Total	*Chippewa*	*Islander*	*Sea Queen*	Total
Number of Trips	86	146	80	312	93	161	79	333
Number of Passengers	4,633	8,835	1,826	15,294	4,305	9,153	1,541	14,999
Percentage of Ridership	30.3	57.8	11.9		28.7	61.0	10.3	
Average Trip Load	53.9	60.5	22.8		46.3	56.9	19.5	
Percentage of Occupancy	51.3	55.0	46.5		44.1	51.7	39.8	

	1987				
	*Chippewa**	*Islander**	*Sea Queen*	*Manitou***	Total
Number of Trips	5	2	82	194	283
Number of Passengers	142	73	2,780	12,854	15,849
Percentage of Ridership	0.9	0.5	17.5	81.1	
Average Trip Load	28.4	36.5	33.9	66.3	
Percentage of Occupancy	27.4	33.2	69.2	33.2	

Capacities of vessels: *Chippewa* – 105; *Islander* – 110; *Sea Queen* – 49; *Manitou* – 200.
*Taken out of service in June 1987.
**Replaced by *Island Princess* in 1988.

LAKESHORE VISITOR USE PATTERNS

Visitation statistics for Apostle Islands National Lakeshore were first collected in 1973, when 12,200 recreation visits were recorded. In 1974 visitation almost doubled, to 24,100, and it dropped back to 22,700 for 1975. In 1976 visitation exploded to 72,825, and it rose in 1983 to 131,609. Between 1983 and 1986, visitation declined at an average rate of 5.4 percent. Recreation visits for 1986 totaled 113,621 (see table 14). Both the lakeshore and the surrounding region recorded dramatic increases in visitation during summer 1987 because of excellent summer weather, increased tourism promotion by the state for the region, and the formation of Apostle Islands Country (a local organization of merchants to promote the tourism potential of the area). The region as a whole recorded a 30 percent increase, while the park recorded a 21 percent increase in visitation (to approximately 137,500). If local and state promotion efforts for the Apostle Islands area continues, it is anticipated that more people will discover the park and visitation will continue to increase. The approved general management plan may change the present visitor experience and, therefore, influence future levels of visitation.

Table 14: Apostle Islands Visitor Use

Year	Campers: Campgrounds	Campers: Back country	Campers: Boat Camping	Campers: Total	Total Visits: Recreational	Total Visits: Nonrecreational*	Total Visits: Total
1976	3,532	1,518	7,117	12,167	71,057	1,228	72,285
1977	2,307	2,592	7,781	12,680	89,992	1,220	91,212
1978	3,327	3,052	8,524	14,903	88,126	1,150	89,276
1979	3,312	1,093	9,207	13,612	75,629	951	76,580
1980	2,151	1,136	11,208	14,495	88,467	1,065	89,532
1981	2,903	2,272	13,400	18,575	103,960	980	104,940
1982	2,833	2,522	14,321	19,676	125,756	656	126,412
1983	2,949	2,560	14,848	20,357	130,913	696	131,609
1984	2,806	2,676	14,080	19,562	127,300	704	128,004
1985	2,766	2,122	15,828	20,716	117,353	745	118,098
1986	3,149	1,566	15,379	20,094	113,621	888	114,509
1987	3,099	2,567	19,370	25,036	137,341	791	138,132

*Nonrecreational visits include visits by persons going to and from inholdings, through-traffic, tradespeople, and government personnel (other than NPS employees) on business in the lakeshore.

Nearly 90 percent of the visitors to Apostle Islands National Lakeshore come from June through September. The average daily visitation for the peak month of August is 1,406. The number of campers has remained fairly constant over the past four years, at about 20,000 annually (see table 15).

Table 15: Apostle Islands Recreational and Nonrecreational Use

	1985: Recreational Use	1985: Percentage of Annual Use	1985: Nonrecreational Use*	1985: Total	1986: Recreational Use	1986: Percentage of Annual Use	1986: Nonrecreational Use*	1986: Total
January	134	0.1	70	204	208	0.2	75	283
February	262	0.2	68	330	291	0.2	66	357
March	372	0.3	65	437	341	0.3	68	409
April	645	0.6	66	711	853	0.8	78	931
May	3,826	3.2	80	3,906	4,685	4.1	72	4,757
June	14,087	12.0	57	14,144	13,775	12.1	42	13,817
July	34,808	29.7	46	34,854	31,221	27.5	75	31,296
August	42,628	36.3	23	42,651	43,593	38.4	40	43,633
September	14,579	12.4	64	14,643	13,414	11.8	101	13,515
October	5,240	4.5	84	5,324	4,395	3.9	123	4,518
November	677	0.6	64	741	606	0.5	148	754
December	95	0.1	58	153	239	0.2	60	299
Total	**117,353**	**100**	**745**	**118,098**	**113,621**	**100**	**948**	**114,569**

*Nonrecreational use includes visits by persons going to and from inholdings, through-traffic, tradespeople, and government personnel (other than NPS employees) on business in the lakeshore.

Most of the lakeshore is accessible only by boat. Visitor use studies indicate two well-defined visitor groups: visitors who come to sail or use other privately owned watercraft and those who come to take the tour boats. A third group is less well-defined and includes nonboating visitors who come for various reasons.

Boating Visitor Use Patterns

About two-thirds of total park visitors arrive on the islands by sailboat. Of the visitors contacted at national lakeshore docks and anchorages in 1985, 91 percent used sailboats. Peak use during the summer season is on weekends, with an average of 40 percent of use recorded during this time. Sailboaters generally come for the superb sailing and to enjoy the resources of the national lakeshore. They moor offshore or use lakeshore docks, coming on shore to use the facilities, picnic, or explore. They rarely camp on shore or take long hikes; those who do camp seem to prefer beach camping. Most sailboaters congregate at relatively secure anchorages or docks at Stockton, Rocky/South Twin, and Raspberry islands. The average age of sailors in 1985 was 37, and less than 3 percent were over 60. A third of them were new, inexperienced boaters.

In 1988 three large marinas in the Bayfield area – Port Superior, Apostle Islands, and Madeline Island – accounted for about 70 percent of the boats entering the archipelago. About 15 percent came from the other marinas in the area, 10 percent sailed in from other Lake Superior ports, and 5 percent launched from public ramps.

The key change in the boating population between 1975 and 1985 has been the dramatic increase in chartering. In 1975, 30 percent of the boats were chartered, and by 1985 this had increased to 57 percent. It is anticipated that the fleet of sailboats available for charter will be reduced as a result of tax law changes that delete some tax advantages of owning a boat available for charter. In line with this trend, midweek visitation (Sunday through Thursday) has been increasing because there are not enough charter boats for hire on weekends to accommodate increased demand. It is anticipated that as midweek chartering increases, visitation will become more even throughout the week, rather than peaking on weekends.

In a 1985 survey of boaters contacted at a national lakeshore dock or anchorage, 80 percent lived in Minnesota, 12 percent in Wisconsin, and 8 percent in other locations. The boaters were highly educated, with over 25 percent having graduate degrees. The 1985 boaters spent an average of 12.5 days around the islands. Fifty-eight percent took only one trip to the Apostle Islands in summer 1985, and the typical boating trip was four days.

One of the concerns of this planning effort is the social carrying capacity for boaters, which refers to the level of use beyond which visitors experience a feeling of crowdedness that impairs the quality of their visits. This capacity is based on values and perceptions of visitors to the lakeshore. Past research has shown that the level of tolerance for crowding among sailboaters is based on the level of use they experienced during their first visits to the islands. Present users appear to have a higher level of tolerance for "crowding" than that indicated in a survey of sailboaters 10 years ago. This level of perceived crowding has been increasing as the park becomes more popular and could affect the visitor experience in the future.

Tour Boat Visitor Use Patterns

Visitors who take the tour boat cruises usually spend only a short time (one hour or less) on shore. Most of the visitors electing to camp or hike are dropped off by the tour boats or water taxi and picked up later. Some visitors with limited time may take the Madeline Island ferry in lieu of the concession tours.

In July and August 1987 a survey of tour boat users found that 60 percent were from Wisconsin and the Minneapolis/St. Paul areas. The users tended to be first-time visitors to the Apostle Islands. Tuesday was the highest volume day for tours, followed closely by Wednesday and Thursday. One reason for this midweek peak may be that a visit to the national lakeshore falls approximately midway on a week-long tour of attractions in northern Wisconsin.

Passengers who took the concessioner's morning Grand Tour around Devils Island tended to stay in the area for one or two nights as opposed to those who took the afternoon tours and who often stayed only for one day, not spending any nights in the area. This trend has been attributed to the 9:30 a.m. departure of the Grand Tour, which is earlier than many day users of the park arrive for tour information. The Islander Tour (around Hermit and Basswood), conducted both morning and afternoon, tended to draw a larger percentage of day visitors.

The most common party size was two people, with nearly 50 percent of all cruise service users traveling in a group this size. The second most common party size was four people. On the shorter tours, however, it was more likely for visitors to be traveling in a large group of six or more people than on the longer tours. This may reflect the reluctance of large groups to pay the added cost of longer tours.

Half of the passengers on the Grand Tour had also taken the Madeline Island ferry. Of those visitors, 90 percent believed the ferry was not a good substitute for the lakeshore tour boat experience. However, 50 percent of the passengers on the shorter Islander tour thought the ferry was a good substitute for the cruise.

The majority of tour passengers were first-time users, and they learned about the opportunity either through the concessioner brochures or by word of mouth.

Approximately 90 percent of the water taxi users were from the Minneapolis/St. Paul area.

Nonboating Visitor Use Patterns

Nonboating visitors account for about 39 percent of total visitation. These visitors are generally adults with family groups and live within a two- to five-hour drive of the lakeshore. Most are through-visitors who are on extended trips and who are passing through the lakeshore as one stop on their itinerary; consequently, they stay only a portion of a day or overnight in the area. They are usually first-time visitors.

Recreational opportunities on the mainland are extremely limited for nonboating visitors. Often the only lakeshore-related experience for these visitors is a stop at the visitor center in the old Bayfield County courthouse, where interpretive displays, a film, and staff provide orientation. A self-guiding tour of the Hokenson Brothers Fishery is available at Little Sand Bay.

INTERPRETIVE RESOURCES AND PROGRAMS

Interpretive Themes

The interpretive themes listed below provide the basis for the interpretive program at Apostle Islands National Lakeshore.

Natural History

Glaciation has played a significant role in shaping the landforms of the Apostle Islands and the Lake Superior basin.

Natural events and human activities have affected the composition, distribution, and successional stages of vegetation in the Apostle Islands.

The composition, distribution, and relative abundance of wildlife species in the lakeshore region depend on plant communities, natural barriers to migration, and human alterations of the environment.

Lake Superior, through its effect on regional weather patterns, influences the lakeshore's natural environment and human activities.

Cultural History

Archeological evidence of early aboriginal cultures can be found throughout the Apostle Islands area.

The Chippewa both historically and currently have used the natural resources of the Apostle Island's area to sustain their way of life. (This theme may be addressed only superficially as it is intended to be treated in depth at the Red Cliff Band of Lake Superior Chippewa's cultural center at Red Cliff.)

Because the Apostle Islands were a center of the Lake Superior fur trade, European influence and settlement came early to the region.

The commercial endeavors of fur trapping, commercial fishing, timber harvesting, and quarrying drew European explorers, traders, and finally settlers to the Apostle Islands region.

The Apostle Islands and Bayfield Peninsula provided a climate moderated by the lake and available land on which many early settlers and immigrants carved out homesteads and farms.

A variety of transportation methods – including boat, rail, and auto – were important to the settlement of and tourism to the area. Island enterprises relied on a variety of modes of transportation, including small and large boats, horses and sleighs, dog sleds, wind sleds, and snow machines.

Since the second half of the 19th century, maritime enterprises have depended on the Apostle Islands' navigational aids to guide ships through the Apostle Islands.

Tourism and recreation were important historically to the settlement and development of this region and in the establishment of the Apostle Islands National Lakeshore. Tourism and recreation are important pursuits today.

The Apostle Islands have been the focus of ambitions and dreams since Europeans first arrived in Chequamegon Bay. They have attracted resource extractive industries, land development and speculative schemes, and conservationists' and recreationists' fervor.

Interpretive Facilities

Visitor Centers. The headquarters visitor center, located in the old Bayfield County courthouse, is generally the first contact that visitors driving from the south on Wisconsin 13 have with the lakeshore. The visitor center contains an information desk, a cooperating association literature display and sales outlet, an auditorium where introductory films and a slide program are shown, exhibits on both natural and cultural history, and a library.

A self-service information station at Little Sand Bay serves visitors arriving from the west on Wisconsin 13; however, the gravel access road probably discourages some visitors. The station contains an information desk, an auditorium where an introductory slide program is shown, and exhibits on natural and cultural history.

A contact station on South Twin Island contains natural history exhibits and a cooperating association literature display and sales outlet.

A newly constructed visitor center on Stockton Island contains a cooperating association literature display and sales outlet. Exhibits on natural and cultural history are scheduled for installation in June 1989.

Wayside Exhibits. There are a total of six wayside exhibits throughout the lakeshore. Two at Little Sand Bay interpret the shipwreck *Sevona* and the Hokenson Brothers Fishery. Three exhibits on Stockton Island interpret the stone quarry, Presque Isle, and Quarry Bay. There is one exhibit at the Nies fish camp on Rocky Island.

Self-Guided Facilities. The Hokenson Brothers Fishery at Little Sand Bay and the Julian Bay trail on Stockton Island are both self-guided, and each has its own booklet.

Traveler Information Stations. There are two information stations, one at Basswood Island and one at Stockton Island. A third is programmed to be installed for the mainland unit at Little Sand Bay.

Personal Services. Evening talks or campfire programs are offered at the visitor center in Bayfield, at Big Bay State Park on Madeline Island, on Stockton Island, and at either South Twin or Rocky Island. Guided walks or tours are given at the Hokenson Brothers Fishery, and on Stockton, Manitou, and Raspberry islands. An interpreter travels throughout the lakeshore and around the Bayfield city dock to answer questions and give interpretive talks.

EXISTING DEVELOPMENT

Roads

The lakeshore staff maintains to minimum standards only 1 mile of secondary dirt road on the mainland for administrative purposes. Because the lakeshore is primarily water oriented, no other roads are currently identified or maintained for visitor use. However, 4.4 miles of access roads inside park boundaries are owned and maintained by the local townships of Russell and Bayfield.

Historic Structures

Historic structures within the national lakeshore include six navigational light stations with more than 38 associated outbuildings or structures, one restored fish camp on Manitou Island (nine structures), the headquarters building (GSA lease) in Bayfield, and the Hokenson Brothers Fishery at Little Sand Bay (10 structures). Structures at three sites are under reservation of use agreements – the Hadland fish camp on Rocky Island (6 structures), the *Sevona* cottage on Sand Island (1 structure), and the Shaw farm on Sand Island (5 structures). At all light stations and the Manitou fish camp at least one employee or volunteer has been stationed during the visitor season for protection, interpretation, and maintenance.

NPS Buildings and Facilities

Year-round maintenance is performed on three employee quarters, a maintenance shop building, and three cold storage buildings. Seasonal maintenance is required for three visitor contact stations and 14 seasonal quarters. In addition there are 12 small field maintenance buildings, such as pumphouses and tool sheds, and six buildings acquired through the land acquisition program (disposition has not yet been determined). Other facilities on the islands include 18 docks ranging in size up to 16 feet wide by 400 feet long. About 10 docks are in need of reconstruction due to freezing lake conditions. A year-round headquarters/visitor center complex in Bayfield is leased through the General Services Administration.

Utility Systems

NPS quarters, visitor centers, campgrounds, lighthouses, and the maintenance shop are supported by 10 septic systems, 39 vault toilets, 12 deep wells with electric pumps, eight gray-water systems, three 15-kw generators, three tramway cars with electric winches, and one radio system (with one tower, one repeater, and one dispatch center). In addition, several solar-powered systems are in use on the islands: two lake filtration systems, 11 nonfilter submersible systems, one submersible pump, and two artesian well pumps. In addition there are two wind-generated power stations.

Solid waste is disposed of at a local landfill. The headquarters building in Bayfield receives water and sewer service from the city of Bayfield. Both the headquarters and park buildings at Little Sand Bay receive electricity from the local power company.

Equipment

Eighteen watercraft, ranging up to 41 feet in length, and one 56-foot barge are used for NPS operations and maintenance. All watercraft are owned and maintained by the National Park Service; 17 boats are equipped with radar. Vehicles include five trucks and three passenger carrying vehicles. Heavier equipment includes two tractors and one trailer.

SPECIAL USE PERMITS

The National Park Service is in the process of granting commercial use licenses to various entities providing services in the lakeshore.

Two special use permits are in effect. One is granted to Bayfield Electric Company to provide electric power to the Point Detour campground (Red Cliff Band of Lake Superior Chippewa). The other permit is granted to John Erickson for the use of the Hokenson dock as a commercial fishery for interpretive purposes.

VISITOR FACILITIES

Campgrounds

The National Park Service maintains designated campsites on the mainland and 13 islands, with a total of 56 small party campsites and seven group sites (see table 16). Designated campsites contain a tent pad, toilet, fire ring, and picnic table. They are delineated by a mowed or cleared area, sign, and number, and the maximum capacity is nine people. Group sites have tables, fire rings, toilets, and large gathering areas. They are capable of accommodating large groups (at least 10 people and a maximum of 30). In 1988 a permit system was instituted for both types of campsites.

Table 16: Campgrounds and Maximum Capacity

NPS Campground Location	Designated Campsites	Group Campsites	Total Capacity
Basswood	6	1	84
Cat	1		9
Devils	1		9
Hermit	0		0
Ironwood	1		9
Mainland	0		0
Manitou	1		9
Michigan	1		9
Oak	6	2	114
Otter	0		0
Outer	2		18
Raspberry	2		18
Rocky	7		63
Sand	3		27
South Twin	4		36
Stockton	21	4	309
York	0	—	0
Total	**56**	**7**	**714**

Trails

A total of 94.6 miles of trails are available on 17 of the islands plus the mainland unit. A total of 46.6 miles of trails on 12 islands are actively maintained by NPS staff (see table 17). The approximately 47 remaining miles are not maintained. Often these include old

roadbeds that are gradually revegetating. Approximately 5,000 linear feet of boardwalks and wooden trail bridges are maintained over wet or fragile areas.

Trails in the lakeshore allow visitors to experience and enjoy a variety of natural and historic features in the lakeshore, commensurate with its carrying capacity. Existing trails are to be evaluated with this objective in mind, and new trails are to be designed, constructed, and maintained to meet this objective.

In 1985 the staff developed standards for all trails within the lakeshore. The standards include layout and design, construction methods, maintenance, bridge requirements, signing, trail rerouting, safety issues, and treatment of archeological resources. Trails important for visitor use were ranked, and the appropriate maintenance level was assigned. Former trails that were determined not to be important for future use were identified and placed in a no-maintenance category. Four maintenance categories have been established for trails within Apostle Islands, as described below:

Maintenance level I – those major trails that are maintained for heavy use and interpretation. They have the first priority for the expenditure of trail maintenance funds, and they are maintained to the highest standard. Trail width is a minimum of 48 inches.

Maintenance level II – trails maintained for medium use. They are used for visitor convenience and receive moderate maintenance. Trail width is at least 24 inches.

Maintenance level III – pristine or wilderness trails that receive only occasional visitor use and thus require only minimal maintenance. They are used by experienced hikers and backpackers or for administrative purposes. They have the lowest maintenance priority except where safety is concerned. Trail width is at least 18 inches.

Maintenance level IV – trails that receive no maintenance at all. These are existing trails that were previously used as trails or roads.

LANDOWNERSHIP AND STATUS

Of the 69,372 acres in Apostle Islands National Lakeshore, the National Park Service owns 42,124 acres, and the state of Wisconsin owns 27,232 acres of submerged lands. The remaining nonfederal lands are owned by the U. S. Coast Guard and local governments (including road rights-of-way). In 1984 the lakeshore staff prepared a *Land Protection Plan* to determine what lands or interests in lands need to be federally owned, and what means of protection other than acquisition are available. The proposals of the *Land Protection Plan* are summarized below.

Russell Township owns three tracts of land within the national lakeshore boundaries. An 11-acre tract lies in the heart of the Little Sand Bay use area and has been developed into a small township park; the Park Service will seek to acquire this tract through donation. A second tract contains 51.4 acres and bisects the mainland unit; it is partially wooded and fronts on Lake Superior. This tract is currently undeveloped, and the Park Service will seek to purchase it. The third tract is a 2-acre parcel on York Island that includes a small memorial. The Park Service will seek to acquire this parcel either through donation or a cooperative agreement.

Table 17: Maintained and Unmaintained Trails

Location	Maintenance Level*	Length (in mi.)	Route
Maintained Trails			
Basswood Island	2	2.95	Dock to quarry to campsites
	2	0.75	Two small quarry trails
		3.70	
Devils Island	3	0.5	East landing to light station
	3	0.5	Light station to west rock landing
		1.0	
Hermit Island	3	0.80	West beach to cabin (so. end)
Oak Island	2	1.35	Dock to northwest beach trail junction
	2	1.60	Beach trail junction to beach
	2	2.30	Beach trail junction to overlook
	2	1.10	Rockpile junction to beach site 9
	2	5.10	Lookout trail, junction to sandspit to dock
		11.45	
Otter Island	3	1.90	Dock to beach trail (north end)
Outer Island	3	7.00	Lighthouse to sandspit
Raspberry Island	1	0.75	Lighthouse to sandspit
	3	0.75	Light to north end, along west side of island
		1.50	
Rocky Island	2	0.90	Dock to west beach
	2	0.50	Dock to Erickson Beach
	2	0.50	Dock to sandspit
		1.90	
Sand Island	2	2.00	Dock to light station
	2	0.60	Dock to ranger quarters
		2.60	
South Twin Island	3	0.25	Dock to airstrip
Stockton Island	1	0.35	Presque Isle to Julian Bay
	2	1.45	Julian Bay to Anderson Point
	2	1.40	Bog Trail
	2	3.70	Presque Isle to Quarry Bay
	2	1.55	Quarry Bay dock to quarry
	2	4.70	Trout Point trail
	2	1.35	Julian Bay beach trail
		14.50	
Total		**46.60**	
Unmaintained Trails			
Bear Island		unknown	
Cat Island		3.2	
Ironwood Island		3.3	
Manitou Island		0.9	
Michigan Island		3.8	
Otter Island		7.5	
Outer Island		15.7	
Sand Island		6.3	
York Island		unknown	
Mainland Unit		6.3	
Total		**47.0**	

*Maintenance level summary:

Level 1 = 1.1 miles of trail
Level 2 = 33.8 miles of trail
Level 3 = 11.7 miles of trail

Bayfield County owns one tract of land within the lakeshore – a 40-acre tract that is managed as forest cropland and is part of a larger section of cropland outside the boundary. There are no improvements. The Park Service will seek to negotiate a cooperative agreement for this tract.

Two tracts within the lakeshore are owned by Ashland County. A 4.8-acre tract on the south end of Basswood Island contains a system of platted rights-of-way in the vicinity of the Brownstone Company quarry. A 15.2-acre tract on Hermit Island also contains platted rights-of-way. The Park Service will seek to acquire these tracts through abandonment.

There are still 28 tracts of land, totaling nearly 350 acres, of nonfederal mineral and water retention rights.

A total of 64.67 acres of federal lands are under reservations for use and occupancy, with terms scheduled to expire between now and 2006. An additional 78.25 acres have been reserved as life estates. On the mainland these tracts are located at Little Sand Bay and Squaw Bay. On the islands they are on Sand, Bear, Hermit, Otter, and Rocky. (See appendix E.)

ENVIRONMENTAL CONSEQUENCES

ALTERNATIVE A: EXISTING CONDITIONS (NO ACTION)

The no-action alternative would continue present management actions, including maintenance practices, resource protection, and visitor services. Construction would be limited to the repair and replacement of existing facilities, including trails, campsites, docks, and buildings.

IMPACTS ON NATURAL RESOURCES

Geology, Soils, and Vegetation

Existing use, maintenance, and management of facilities, including buildings, utility systems, roads, parking areas, campgrounds and campsites, trails, and docks have resulted in minor impacts to approximately 238 acres of the northern hardwood/hemlock forest ecosystem. Continued use and maintenance of these facilities would result in only very minor new disturbance to adjacent soils, vegetation, and wildlife. Areas that have been most affected include the immediate vicinities of the visitor contact facility and the Hokenson Brothers Fishery at Little Sand Bay; visitor facilities on Stockton and South Twin islands; the Oak Island campground; the Raspberry Island light station and, to a lesser extent, the light stations on Michigan, Sand, Devils, Outer, and Long islands; and the Manitou fish camp. In addition to these areas, many sensitive sandspits, cuspate forelands, and beaches have been affected by boat landing, picnicking, and camping. The kinds of impacts occurring at these locations include minor erosion of soft sandstone bedrock; displacement, compaction, and erosion of soils; alteration and destruction of vegetation; displacement and death of wildlife; degradation of air and water quality; litter; and noise pollution.

Minor bedrock and soil erosion and soil compaction and displacement would continue to occur in the concentrated visitor use areas described above. Compaction results in dense firm soils with reduced pore space, which limits air and water infiltration. This results in an alteration in soil chemistry and vegetative composition and can restrict wildlife burrowing. Buildings, trails, and other impermeable surfaces either wholly or partially eliminate water and air infiltration into soil, which also alters soil chemistry and vegetation composition and affects burrowing wildlife.

Disturbed soils increase the potential for erosion, including the loss of topsoil. Sloped areas are most prone to erosional problems. The loss of topsoil reduces an area's ability to support vegetation and wildlife. Soil that erodes into lakes and streams can degrade water quality and negatively impact aquatic ecosystems. Within the national lakeshore this does not appear to be a problem because only minor levels of human-caused soil erosion have occurred, and the sheer force and volume of Lake Superior allows for rapid dispersal.

Dredging causes in temporary resuspension of lake bottom sediments, resulting in increased turbidity, greater nutrient concentrations, and disturbance or loss of benthic organisms, fish and fish-spawning grounds, and other aquatic species, including plants. Even though the effects of dredging have not been specifically studied, such activities within the lakeshore are performed so infrequently that this activity does not appear to be having long-term adverse effects on aquatic ecosystems.

Some docks, breakwaters, and other shoreline development and artificial shoreline protection measures may be altering natural coastal processes. The full extent of this

problem is not well known, and further study is needed. Sandspits and beaches may be affected wherever the littoral drift of shoreline sediments is impeded by shoreline structures. Dredging may be required to remove sand buildup. The removal or relocation of some docks and breakwaters may be necessary. Erosion abatement techniques to protect the historic light stations on Outer, Michigan, and Raspberry islands could also be having an impact on coastal processes.

Past logging and fire suppression activities in the lakeshore and the region have resulted in large-scale alteration of natural vegetative composition and wildlife habitats. Under all alternatives, a fire management plan would be developed to address the issue of using fire to restore the historic vegetation mosaic, to control exotic plant species, and to improve wildlife habitats.

Maintaining clearings at significant historic farmsteads and nonnative vegetation at light stations for interpretive purposes would continue to provide small altered or artificial habitats. Nonnative species have not assumed any significant threat to native species in adjacent areas.

Wildlife

Important nesting areas for colonial nesting birds (gulls, herons, and cormorants) would continue to be protected from human disturbance. This protection includes 500-foot inland and seaward restrictions on human use in these areas from May to September. Even with these restrictions, human disturbance may still occur during the critical nesting period. If so, it could be fatal to some nestlings.

Docks and breakwaters would continue to provide protected habitat for small fish and other aquatic species.

The continuation of hunting, trapping, and fishing could have significant impacts on fish, game, and furbearer populations. Controlling deer and beaver numbers may help to improve overbrowsed areas and to restore original drainages. Under all alternatives specific plans would be developed for the management of huntable and trappable species.

Black bear/human incidents have not yet become a problem in the lakeshore, but this may change if the bear or lakeshore visitor population increases. Encounters can be fatal to bears and humans. To help reduce the potential for conflicts, bear monitoring would continue, and facilities would be bear-proofed. Certain islands or island areas could also be temporarily closed to public use. Future bear control actions, including bear removal, could be required if incidents occurred.

Threatened or Endangered Species

Continued human presence within the lakeshore provides potential for disturbance to the threatened bald eagle and the endangered piping plover. Monitoring and protection of nesting areas would continue, and ecological studies on Long Island would provide data for the management and protection of the piping plover.

Bald eagle tolerance to human presence is highly variable, both seasonally and among individual eagles. Some eagles nest and accept people who are very close, while others are very intolerant of human presence and fly away if anyone is within 0.25 mile.

Disturbance to eagles has been observed but not systematically studied. Disturbance could disrupt courtship activities and cause adults to fly from nests and leave eggs exposed during incubation. This could result in the death of some birds.

At present, human disturbance in the lakeshore appears to be minimal, including during the critical periods of breeding, incubation, and early hatching (March through mid-June). Visitor use near nesting, perching, and feeding areas would continue to be discouraged, and areas would be closed if necessary (including trails and campsites). Continued use and maintenance of existing facilities is not expected to have any significant long-term effects on any threatened or endangered species.

Water Resources

Campsites on several islands, including York, Hermit, Michigan and Cat, would continue to be maintained, and no toilet facilities would be provided. Many of these campsites are on beaches and sandspits with well-drained soils, where there is a high potential for human wastes to enter surface and subsurface water sources. This could result in the contamination of surface or subsurface water sources.

Minor water quality degradation undoubtedly occurs from the use of boats and motor vehicles in the lakeshore (boat exhaust and leakage of petrochemicals), but this has not been studied or documented. Pollutants originating within the lakeshore do not appear to be causing any significant long-term impacts on water quality or aquatic ecosystems. The massive volume and force of water in Lake Superior allows minor levels of pollutants to disperse quickly. Lake bottom testing done at Stockton Island, the lakeshore's most popular boat docking facility, identified no accumulated bottom contaminants.

Floodplains and Wetlands

Lakeshore bogs and marshes are popular areas for wildflower and wildlife viewing. This activity does not appear to be having any significant long-term impacts on these wetlands. There would be no effects on floodplains or wetlands under alternative A.

Air Quality

Air pollution does occur in the lakeshore, but it has not been monitored or studied. The principal pollutants are believed to be emissions from motorboats and motor vehicles and smoke from campfires. Pollutants that do originate in the lakeshore are minor, and they probably disperse quickly so they do not result in any significant degradation of local or regional air quality.

Noise and Litter

Noise and litter would continue to be minor problems during peak use periods, mainly in and around concentrated visitor use areas such as campgrounds, picnic areas, boat-launching and -docking facilities, popular boat-mooring locations, along trail corridors, and interpretive sites. Litter would continue to be cleaned up as manpower permits. Noise could result in additional disturbances to wildlife and intrude on the experiences of visitors seeking solitude and isolation.

IMPACTS ON WILDERNESS VALUES

Wilderness characteristics at Apostle Islands National Lakeshore include the absence of permanent or obvious human presence, the absence of permanent improvements or human habitation, unimpaired ecologic or geologic features, solitude, and the opportunity for a primitive and unconfined type of recreation. Under alternative A lands exhibiting these values would not be specifically managed to preserve them. These values could deteriorate over the long term as a result of increased visitation or development.

IMPACTS ON CULTURAL RESOURCES

Cultural resources would continue to be affected by wear and tear from concentrated use, particularly the six light stations. The use of logging camps and associated clearings on Oak, Basswood, Otter, and Stockton islands as campgrounds could cause some site deterioration. Campsites have been designated on edges of the clearings to limit site degradation. Adaptive or interpretive uses of historic structures could cause some loss or destruction of historic fabric. Archeological sites could be inadvertently disturbed during facility maintenance. Vandalism and illegal artifact collection would also harm resources, especially underwater archeological resources and unknown subsurface resources.

Increased visitor use would raise the potential for adverse impacts on identified and unidentified cultural resources. Many prime recreation sites on the islands contain significant historic and prehistoric resources. Site use and interpretation would increase the potential for adverse effects; however, interpretive programs would also make people aware of the resources' fragile nature, thus encouraging visitors to help protect the resources. Maintaining and managing landscapes and vegetation at light stations, farmsteads, and other historic properties would help maintain and perpetuate the historical integrity of these sites.

The only protection for submerged cultural resources is through talking to divers with permits about the need to leave artifacts in place. Without further protective measures, artifact loss and vandalism would continue to occur because of unscrupulous divers.

IMPACTS ON VISITOR USE

Visitors would find conditions generally as they do today. Public access to Raspberry, Manitou, and Stockton islands would be limited to the concession-operated tour boat. The other islands would generally continue to be remote and difficult to reach except by private or charter boats or the water taxi service. Visitors not going out to the islands could get information and see interpretive programs at the Bayfield visitor center and the Little Sand Bay visitor contact facility. Sailboat charters would be expected to remain at present levels. Camping would be expected to increase. Overall park visitation patterns would not be expected to change significantly. Hiking opportunities would continue at approximately the present level, and most visitors would remain unaware of the available routes because they would not be improved or marked. Additional opportunities to view and learn about the lakeshore's archeological and historic resources would go unrealized.

Eagle and Gull islands would continue to be closed to visitor use, and the continued use of North Twin Island for scientific research would restrict recreational opportunities for visitors. (This impact would be the same under all alternatives.)

IMPACTS ON THE SOCIOECONOMIC ENVIRONMENT

Any increases in lakeshore visitation would benefit the local economies of Bayfield and Ashland counties to an unknown degree. NPS staff would continue to purchase goods and services from local businesses, both for government and private use, and this would have a minor, long-term positive effect on the local economy.

The acquisition of any outstanding mineral rights would preclude future economic benefits from mining activities. However, it is believed that the profit potential from mining is limited within the lakeshore. Owners would be compensated for the value of their rights.

ALTERNATIVE B: PRIMITIVE EMPHASIS

IMPACTS ON NATURAL RESOURCES

The construction of proposed facilities would result in the disturbance of 2 acres of the northern hardwood/hemlock forest ecosystem. Among the action alternatives (B-E), alternative B would involve the least amount of facility development. Proposed construction would avoid areas containing fragile or unique plant communities, wetlands, floodplains, or habitat for critical, threatened, or endangered species. Each development proposal would be individually evaluated to determine potential negative impacts to bald eagles. The 2 acres of new disturbance would be offset by the restoration to natural conditions of approximately 2 acres that were previously disturbed. Environmental impacts from proposed development and use would be similar to those described for alternative A. Site-specific impacts are discussed below.

The construction of an interpretive trail on Basswood Island and seasonal staff quarters on Manitou Island would disturb approximately 0.5 acre of soils, vegetation, and wildlife habitat on these islands. The seasonal staff quarters would be designed at a minimum scale to serve its intended purpose and blend with the surrounding environment. Constructing a boardwalk at the Quarry Bay group campground on Stockton Island would result in minor surface disturbance, which would be offset by the long-term reductions of impacts on sensitive beach vegetation.

Removing campsites on the Raspberry Island sandspit would help reduce soil compaction and erosion, and it would eliminate impacts on sensitive beach vegetation. Removing a ranger residence and campsites on Rocky Island, plus the visitor contact station and employee housing on South Twin Island, would allow these sites to be restored to their natural appearance. Wildlife habitat on these islands would increase slightly as a result.

Threatened or Endangered Species

As discussed under alternative A, the approved *Resources Management Plan* calls for the monitoring of all threatened or endangered species to ensure continued protection. The actions of this alternative would not affect threatened or endangered species recognized by the state or federal government. Measures to mitigate any potential adverse effects on bald eagles would include establishing a minimum 0.25-mile buffer zone around nesting areas, timing construction to avoid critical reproductive periods, restricting visitor use near nesting areas, and closely monitoring visitor use within 0.25 mile of known nesting and primary feeding areas. At the time of specific site planning, further surveys would be conducted to ensure that no state or federal threatened or endangered species would be adversely affected.

Floodplains and Wetlands

Bogs and marshes within the national lakeshore are popular areas for visitors to see wildflowers and wildlife. This activity does not appear to be having any significant long-term impacts on these wetlands. There would be no impact on floodplains or wetlands as a result of implementing this alternative.

IMPACTS ON WILDERNESS VALUES

The zoning and managing of certain portions of Apostle Islands National Lakeshore as primitive would protect the wilderness characteristics of these areas. These characteristics include the absence of permanent or obvious human presence, the absence of permanent improvements or human habitation, unimpaired ecologic or geologic features, solitude, and the opportunity for a primitive and unconfined type of recreation. Under this alternative approximately 29 percent of the lakeshore would be managed to provide this type of wilderness experience.

IMPACTS ON CULTURAL RESOURCES

Limiting access, facilities, and staff on most of the islands would result in both positive and negative impacts on cultural resources. Limited public access on most islands would result in fewer visitors, but it would also make maintenance and protection more difficult. Protection and maintenance activities for sites on Raspberry, Manitou, and Stockton islands would be less difficult and less time-consuming. Encouraging use on these islands as a result of tour boat access might cause overuse of resources. However, expanded interpretive programs would help increase visitor appreciation of cultural resources and encourage visitors to aid in their protection. Expanded interpretive efforts would include installing signs at the McCloud-Brigham farmstead on Basswood Island, installing a wayside interpretive exhibit or providing brochures for the Trout Point logging camp on Stockton Island and the shipwreck *Noquebay* in Julian Bay, and clearing vegetation at the brownstone quarry on Hermit Island.

The historic light stations on Sand, Devils, Michigan, and Outer islands would be closed to visitors (buildings only). Interpretive signs or brochures would replace personal services as the primary means of interpretation. The removal of on-site NPS personnel would increase the potential for vandalism and site misuse, which could result in the loss of historic quality and integrity. This impact would be mitigated by initiating routine patrols and installing alarm systems. The historical landscaping would continue to be maintained.

Underwater cultural resources would be better protected through an agreement with the state to give the National Park Service protection authority.

The natural revegetation of the historical landscape at the quarry and the McCloud-Brigham farmstead on Basswood Island would result in the irretrievable loss of these resources. The thorough documentation of these sites would help mitigate these losses.

Archeological surveys would be completed before any development proposals were undertaken. These surveys would provide the necessary information to avoid archeological resources or to mitigate any impacts.

IMPACTS ON VISITOR USE

The emphasis on self-discovery for visitors on most of the islands would result in remote and primitive experiences. Visitors without their own boats might have difficulty arranging independent transportation to islands not served by the tour boat. Expanded visitor facilities in Bayfield would give visitors who could not leave the mainland a better introduction to the islands. Visitation would be expected to stabilize at present levels.

Few visitors would be affected by closing most of the light stations. The station on Raspberry Island, which is the one most people currently visit, would remain open, and it is a good example of a light station. Removing the campsites on the Raspberry Island sandspit would deprive future visitors of the opportunity to stay overnight at this popular area. Interpretation of the natural resources and cultural heritage would be expanded through the use of wayside exhibits and brochures.

IMPACTS ON THE SOCIOECONOMIC ENVIRONMENT

As described under alternative A, visitation at the national lakeshore would help the local economies of Bayfield and Ashland counties to an unknown degree. If visitation remained relatively stable, there would be no significant change in existing benefits.

Construction projects would provide short-term economic benefits to local communities by providing jobs and their associated incomes to local residents and by increasing the purchase of goods from local distributors. NPS employees would continue to purchase goods and services from local businesses for both government and private use, which would have a minimal positive effect on the local economy.

The acquisition of mineral rights by the National Park Service would preclude the potential for future mining operations. This could result in an unknown loss of profit to the owners. The potential for profitable mining operations on the islands is believed to be limited. If these rights were acquired by the National Park Service, the owners would be compensated at fair market value.

ALTERNATIVE C: ISLAND EMPHASIS

IMPACTS ON NATURAL RESOURCES

The construction of proposed facilities under this alternative would result in disturbance of approximately 41 acres of the northern hardwood/hemlock forest ecosystem. Alternative C would involve somewhat more new facility development than would alternatives A and B, but overall impacts would still be minor. Approximately 1 acre of previously disturbed ground would be restored to natural conditions. The net negative impact would be disturbance of 40 acres, which is 0.06 percent of the total lakeshore acreage. Proposed development would be designed to avoid floodplains, wetlands, or areas containing fragile, unique, threatened, or endangered plant or wildlife species. Each development proposal would be individually evaluated for potential impacts to bald eagles. Facilities would be constructed at a minimum scale to serve their intended purpose and would be designed to blend with the environment.

Impacts would be similar to those described under alternatives A and B and would include the minor destruction of bedrock; increased soil displacement, compaction, and erosion; damage to or destruction of vegetation; wildlife displacement and habitat destruction; and minor degradation of air and water quality. Use impacts would include soil compaction along trails, at campsites, and around development sites, which would result in a greater erosion potential and vegetation disturbance and destruction. Maintenance activities would result in vegetation removal, temporary wildlife displacement, and short-term air and water pollution. Noise near construction sites, maintenance areas, and concentrated visitor use areas could disturb wildlife and intrude on the experiences of visitors seeking solitude and isolation. The locations where these impacts would occur under alternative C are identified below.

If roads into the Little Sand Bay area were widened or realigned, approximately 1.5 acres of bedrock, soils, vegetation, and wildlife habitat would be affected. If the roads were paved, this would reduce problems with dust. New facility construction at Little Sand Bay, including access road improvements, would disturb 20.5 acres in this area. Trail construction on Raspberry, Stockton, Oak, Basswood, Manitou, Sand, Outer, Hermit, Michigan, and Rocky islands, plus the mainland unit, would result in soil and wildlife disturbances and vegetation loss on a total of 19 acres. Constructing or relocating campsites on Oak, Manitou, Basswood, Sand, Outer, York, Hermit, Michigan, and Otter islands would disturb 12 acres of vegetation and wildlife habitat.

Encouraging visitors to spend more time on the islands could increase the chances of inadvertent and deliberate disturbance of threatened or endangered species. New tour boat stops at Basswood, Oak, Sand, and Outer islands, as well as at Raspberry, Manitou, and Stockton, would increase disturbances to soils, vegetation, and wildlife at and near landing sites.

Relocating the present ranger station on Sand Island to the East Bay dock would allow the old site to be restored to a more natural appearance. Because there is existing development at the new site, additional impacts would be minimized.

Removing campsites from Raspberry and Michigan islands, and constructing boardwalks on Stockton and Michigan islands, would increase the protection of sensitive vegetation at these sites. Removing the employee quarters and interpretive station on South Twin would allow approximately 0.5 acre to be restored to natural conditions.

ENVIRONMENTAL CONSEQUENCES

Constructing a footbridge across the inlet at Quarry Bay on Stockton Island could affect this wetland area. The bridge would allow access to Presque Isle, with resulting adverse effects on soils, vegetation, and wildlife. Improving the campground at Quarry Bay would have negligible impacts.

Continued vegetative clearing at historic sites and quarries on Outer, Basswood, Oak, and Stockton islands would destroy some vegetation at these locations.

Placing mooring buoys around the inner islands would direct and concentrate overnight sailboat use in congested areas. During the day the buoys could be perceived as visual intrusions.

Constructing docks at Basswood and Sand islands could interrupt the littoral drift, and on the shoreline bedrock, soils, vegetation, and wildlife would be affected. If a study of the Otter Island dock found that it was altering the configuration of the island's sandspit, the dock would be relocated to a more desirable location, thus reducing its impact on natural shoreline processes.

Threatened or Endangered Species

As discussed under alternative A, the approved *Resources Management Plan* calls for the monitoring of all threatened or endangered species to ensure continued protection. The actions of this alternative would not affect threatened or endangered species recognized by the state or federal government. Measures to mitigate any potential adverse effects on bald eagles would include establishing a minimum 0.25-mile buffer zone around nesting areas, timing construction to avoid critical reproductive periods, restricting visitor use near nesting areas, and closely monitoring visitor use within 0.25 mile of known nesting and primary feeding areas. At the time of specific site planning, further surveys would be conducted to ensure that no state or federal threatened or endangered species would be adversely affected.

Floodplains and Wetlands

Constructing a footbridge across the inlet at Quarry Bay on Stockton Island could affect this wetland area. Extreme care would be taken at the time of site planning to minimize any adverse effects. Otherwise, there would be no impacts to floodplains or wetlands under this alternative.

IMPACTS ON WILDERNESS VALUES

The zoning and managing of certain portions of Apostle Islands National Lakeshore as primitive would protect the wilderness characteristics of these areas. These characteristics include the absence of permanent or obvious human presence, the absence of permanent improvements or human habitation, unimpaired ecologic or geologic features, solitude, and the opportunity for a primitive and unconfined type of recreation. Under this alternative approximately 6 percent of the lakeshore would be managed to provide this type of wilderness experience.

IMPACTS ON CULTURAL RESOURCES

This alternative, with the emphasis on encouraging visitors to spend more time on the islands, would increase the potential for misuse and overuse of cultural resources. As described under alternative A, cultural resources would continue to be affected by general wear and tear from visitor use, loss or destruction of historic fabric because of adaptive and interpretive uses, misuse of sites with identified or unidentified cultural resources, inadvertent disturbance of archeological sites from development and maintenance activities, and vandalism and illegal collection of artifacts.

Improved access to Little Sand Bay might increase the potential for degradation of the Hokenson Brothers Fishery.

Closing the light station buildings on Sand, Devils, Michigan, and Outer islands to the public and removing on-site NPS personnel would increase the potential for vandalism and site misuse, which could result in the loss of historic quality and integrity. Routine patrols and alarm systems would help mitigate adverse impacts.

Maintaining and managing landscapes and vegetation at light stations, farmsteads, and other historic properties would help maintain and perpetuate the historical integrity of these sites.

The new dock at Sand Island and the trail to the island's light station would encourage more visitation and would increase the potential for site wear and tear, misuse, and possibly vandalism.

General wear and tear and possible loss of historic fabric as a result of interpretation and visitor use could affect the Noring farmstead on Sand Island; the Cedar Bark Lodge site on Hermit Island; the Brownstone Company quarry and the McCloud-Brigham farmstead on Basswood Island; the Trout Point logging camp and the shipwreck *Noquebay* on Stockton Island; the archeological site and fish camp on Manitou Island; the Bear Island logging camp; and the Schroeder Lumber Company logging camp 5 on Oak Island.

NPS acquisition of lake bottom lands would greatly enhance the preservation of submerged cultural resources because the National Park Service would actively protect resources and enforce regulations, in accordance with cultural resource policies and guidelines.

Archeological surveys would be undertaken at Little Sand Bay, Sand, Basswood, Stockton, Hermit, Outer, and Michigan islands before any development proposals at these sites were implemented. These surveys would provide the necessary information to avoid archeological resources or to mitigate any impacts.

IMPACTS ON VISITOR USE

Visitor use under alternative C, compared to alternatives A and B, would be better distributed among the islands and the mainland, and visitor use over the life of this plan would probably not result in crowding or the overuse of facilities. An expanded tour boat schedule would give visitors more flexibility in selecting which parts of the national lakeshore they would like to see. This flexibility, when coupled with the increase in the number of camping sites, would be expected to increase visitation over present levels. Paving the road to Little Sand Bay and developing the area as a threshold for the

islands would give visitors a focal point for resource-related activities not currently available in Bayfield. Visitors would be encouraged to explore more of the islands through the construction of new trails and interpretive facilities. All light stations except those on Raspberry and Sand islands would be closed to the public. However, few visitors would be affected because currently most visitor use is recorded at the Raspberry Island light station.

IMPACTS ON THE SOCIOECONOMIC ENVIRONMENT

Development under alternative C would increase visitation in Bayfield and Ashland counties by an unknown amount. On a controlled, long-term basis, increased visitation would create new jobs, stimulate development, and produce an additional flow of money into the local communities. Development of a tourist industry would be consistent with the *Red Cliff Overall Economic Development Plan*, which proposes increased tourist-related facilities on the Red Cliff reservation.

Proposed development projects would provide short-term economic benefits to local communities by providing jobs and their associated incomes to local residents, and by increasing the purchase of goods from local distributors. Purchases of local goods and services by NPS employees would continue to have a modest positive effect on the local economy.

Additional day and overnight visitors in the cities of Bayfield, Red Cliff, Cornucopia, and Ashland would increase the potential for parking, traffic flow, and law enforcement problems. Increased visitation could also place additional strains on fire protection, sewage treatment, and other public and private facilities and services. The magnitude of these impacts would depend on the amount of additional visitation and the resulting public and private response from the local communities.

Any improvements or increases in public services or facilities would require increased spending by the responsible local governments. This situation could stress local governments' budgets unless sales tax revenues also increased with visitation.

Authorization for the National Park Service to finance road improvements would remove the economic burden of road maintenance from the township. If authorization was through a lease agreement, there would be a positive economic gain from lease payments.

Mineral rights would be acquired by the National Park Service, thus precluding the potential for future profit from extractive operations. This could result in an unknown loss of profit to the owners, but they would be compensated at fair market value.

ALTERNATIVE D: MAINLAND EMPHASIS

IMPACTS ON NATURAL RESOURCES

The construction of proposed facilities under this alternative would result in the disturbance of approximately 64 acres of the nortnern hardwood/hemlock forest ecosystem. Approximately 15 acres of previously disturbed area would be restored to natural conditions. The net negative impact would be disturbance of 49 acres, which is 0.07 percent of the total lakeshore acreage. Proposed construction activities would avoid areas with threatened or endangered wildlife species. Facilities would be constructed at a minimum scale to serve their intended purpose and would be designed to blend with the environment.

Impacts on natural resources would be similar to those described for alternatives A and B. Most new facility development would occur on the mainland, which is where most of the potential impacts would occur. Construction-related impacts would include destruction of bedrock; displacement, compaction, and erosion of soils; vegetation damage or destruction; wildlife displacement and habitat destruction; and minor water and air quality degradation. Use impacts would include soil compaction along trails, at campsites, and around development sites, which would result in a greater erosion potential and vegetation disturbance and destruction. Maintenance activities would result in vegetation removal, temporary wildlife displacement, and short-term air and water pollution. Noise near construction sites, maintenance areas, and concentrated visitor use areas could disturb wildlife and intrude on the experiences of visitors seeking solitude and isolation. The locations where these impacts would occur under alternative D are identified below.

Improving the road to Little Sand Bay, Meyers Road, and Sand Point Road would have impacts on approximately 4.5 acres of bedrock, soils, vegetation, and wildlife habitat. Developing new roads to the harbor complex in Little Sand Bay and from the harbor complex to the Point Detour campground would have similar impacts on natural resources.

Development of a new harbor complex, ranger station, visitor contact station, shoreline trail, and parking areas at Little Sand Bay would result in impacts to a maximum of 80 acres. Impacts would include some destruction of sandstone bedrock, soil compaction, damage to or destruction of terrestrial (northern hardwood) and wetland vegetation, disturbance or loss of wildlife (including waterfowl, shorebirds, and fish), water and air quaiity degradation, and increased litter and noise. The installation of fueling facilities would increase the potential for petrochemical accidents, including fires and spills. Such accidents could result in severe impacts on water quality and the destruction of nearby aquatic ecosystems. Periodic dredging would have impacts similar to those discussed under alternative A, including increased turbidity, greater nutrient concentrations, and disturbance or loss of benthic organisms and aquatic communities.

The new parking and picnic areas at the end of Meyers Road and the new parking area and campground at the end of Sand Point Road would result in soil compaction, damage to vegetation, and disturbance of wildlife in and near these areas.

New trails on Raspberry, Basswood, Outer, Hermit, and Stockton islands, plus the mainland, and extended and improved trails on Oak, Rocky, and Sand islands, would result in soil compaction, removal of vegetation, and disturbance of wildlife habitat on a total of 3.83 acres.

Constructing a footbridge at Quarry Bay could affect this wetland area, and it would allow access to Presque Isle, with resulting effects on soils, vegetation, and wildlife. Boardwalk construction on Stockton and Michigan islands would help protect sensitive beach vegetation.

Moving the ranger residence on Sand Island closer to the East Bay dock area would result in a loss of vegetation and habitat at the new site. These impacts would be offset by returning the existing site to natural conditions and restoring wildlife habitat.

Converting the East Bay campground on Sand Island to a picnic area would cause no additional impacts. Impacts on natural resources could be reduced because the site would probably be less used. Removing the campsites on Raspberry and Michigan islands would eliminate any adverse resource impacts and would allow the restoration of natural conditions at these sites.

Approximately 2 acres would be disturbed on Michigan Island by trail and boardwalk construction. Removing the campsites from the sandspit would help protect sensitive beach vegetation.

The maintenance of clearings at historic sites (quarries, light stations, farmsteads) on Stockton, Oak, Basswood, and Michigan islands would destroy some vegetation.

Constructing new docks at Sand and Basswood islands could interrupt natural shoreline processes.

Removing the dock and buildings on Otter Island, the cabin on Hermit Island, the employee residence and interpretive station on South Twin, and the campsites on York Island would increase the wilderness attributes of these islands. Also wildlife habitat would be improved, and the potential for soil compaction, vegetation loss, and wildlife disturbances would be reduced on 4.18 acres.

Threatened or Endangered Species

As discussed under alternative A, the approved *Resources Management Plan* calls for the monitoring of all threatened or endangered species to ensure continued protection. The actions of this alternative would not affect threatened or endangered species recognized by the state or federal government. Measures to mitigate any potential adverse effects on bald eagles would include establishing a minimum 0.25-mile buffer zone around nesting areas, timing construction to avoid critical reproductive periods, restricting visitor use near nesting areas, and closely monitoring visitor use within 0.25 mile of known nesting and primary feeding areas. At the time of specific site planning, further surveys would be conducted to ensure that no state or federal threatened or endangered species would be adversely affected.

Floodplains and Wetlands

The development of a harbor complex at Little Sand Bay would have a temporary adverse effect on an intermittent stream in the area because of siltation during construction. Only a trail would be constructed around the marsh area, so the impact on this wetland would be minimal and short term. There would be no long-term adverse impacts on floodplains or wetlands under this alternative.

IMPACTS ON WILDERNESS VALUES

The zoning and managing of certain portions of Apostle Islands National Lakeshore as primitive would protect the wilderness characteristics of these areas. These characteristics include the absence of permanent or obvious human presence, the absence of permanent improvements or human habitation, unimpaired ecologic or geologic features, solitude, and the opportunity for a primitive and unconfined type of recreation. Under this alternative approximately 18 percent of the lakeshore would be managed to provide this type of wilderness experience.

IMPACTS ON CULTURAL RESOURCES

Cultural resources would continue to be affected by general wear and tear from concentrated use; the loss or destruction of historic fabric as a result of adaptive and interpretive uses of historic structures; the inadvertent disturbance of archeological sites from development and maintenance facilities; and vandalism and the illegal collection of resources, particularly submerged resources. Greater visitor use on Sand, Raspberry, Oak, Manitou, Basswood, and Stockton islands would increase the potential for misuse and overuse of cultural resources. Increases in visitor use and facility development would increase the potential for adverse impacts on identified and unidentified cultural resources. Use and interpretation of sites would increase the potential for vandalism, fire, misuse, and damage to cultural resources. Interpretation, however, would also increase cultural resource awareness, thereby encouraging visitors to help protect these resources.

Closing the light station buildings on Sand, Devils, Michigan, and Outer islands to the public and removing on-site NPS personnel would increase the potential for vandalism and site misuse, which could result in the loss of historic quality and integrity. Routine patrols and alarm systems would help mitigate adverse impacts.

Maintaining and managing landscapes and vegetation at light stations, farmsteads, and other historic properties would help maintain and perpetuate the historical integrity of these sites.

Improved access to Little Sand Bay might increase the potential for degradation of the Hokenson Brothers Fishery. The development of a new harbor complex at Little Sand Bay would result in no significant impact on cultural impacts (see NPS 1978).

The new dock at Sand Island, the trail to the island's light station, and conducted tours of the station would encourage more visitation and increase the potential for site wear and tear, misuse, and possibly vandalism. Light station tours could also result in some loss of historic fabric. The presence of an interpreter, however, would help prevent vandalism.

NPS acquisition of submerged cultural resources would greatly enhance the protection of these resources. However, unidentified submerged cultural resources could be discovered and removed by unscrupulous divers.

Archeological surveys would be undertaken before any construction activities. These surveys would provide the necessary information to avoid archeological resources or to mitigate any impacts.

IMPACTS ON VISITOR USE

The implementation of alternative D would help distribute visitor use among the islands and the mainland so that future crowding or overuse did not reach levels that would change the present quality of recreational opportunities on the islands. The development of camping, hiking, interpretive, and winter recreational opportunities on the mainland would encourage more year-round use. Visitation would be expected to increase, and visitors would probably spend more time in Little Sand Bay using the additional facilities. Kiosks in surrounding communities would tell potential visitors about the lakeshore. More frequently scheduled tours of the islands would give nonboating visitors better opportunities to visit the islands. All light stations except for those on Raspberry and Sand islands would be closed to visitors, but few visitors would be affected. Developing the Sand Island light station for interpretive tours would provide new interpretive opportunities. Visitors seeking peace and solitude might have to avoid the islands with tour boat access.

The development of a harbor/breakwater facility at Little Sand Bay would provide the boating public with a harbor of refuge on the west side of Bayfield Peninsula. Little Sand Bay is approximately 14 miles northeast of the Cornucopia harbor and about 14 miles north (around the west side of the Bayfield Peninsula) from the Buffalo Bay harbor at Red Cliff. Such a harbor of refuge would improve boating safety along the entire west side of the Bayfield Peninsula.

IMPACTS ON THE SOCIOECONOMIC ENVIRONMENT

Alternative D would increase visitation in Bayfield and Ashland counties by an unknown amount. On a controlled, long-term basis increased visitation would create new jobs, stimulate development, and produce an additional flow of money into the local communities. The effect of increased visitation would be even more positive for the local economy if tourism developed into a year-round industry instead of a seasonal phenomenon. Development of a tourist industry would be consistent with the *Red Cliff Overall Economic Development Plan*, which proposes increased tourist-related facilities on the Red Cliff reservation.

Some local residents would be adversely affected by localized intrusions on the peace and solitude now found in the area.

Construction projects would provide short-term economic benefits to local communities by providing jobs and income to local residents, and by increasing the purchase of goods from local distributors. The purchase of goods and services by NPS employees for government and private use would continue to have a modest positive effect on the local economy.

Additional day and overnight visitors in the cities of Bayfield, Red Cliff, Cornucopia, and Ashland would increase the potential for parking, traffic flow, and law enforcement problems. Also, additional strains would be placed on fire protection, sewage treatment facilities, and other public and private facilities and services. The magnitude of these impacts would depend on the amount of additional visitation and on how the public and private sectors responded to these challenges.

Any improvements or increases in public services or facilities would require increased spending by the local governments. This situation could stress the local governments'

budgets unless the expenditures were offset by increased tax revenues from visitor spending.

Additional recreational boating on Lake Superior could increase conflicts with the local fishing industry. Potential impacts could range from damaged fishing nets and buoys to localized disturbance of the fisheries. Such effects would be detrimental to the area's fishermen, and the U.S. Coast Guard might have to arbitrate conflicts or establish a special system of navigational aids to mitigate conflicts.

The property tax base would decrease with the purchase by the National Park Service of about 200 acres of private property. The current tax rate is $4 per acre. The federal government would make payments in lieu of taxes to mitigate this loss.

Depending on the amount of interest ultimately acquired by the National Park Service, a maximum of about 300 acres of second-growth mixed hardwoods would no longer be available for pulpwood harvest, resulting in some economic loss. Land values vary from year to year, but currently they run about $125 to $200 per acre. The purchase or lease of this property, as well as other outstanding mineral rights, would offset any short-term economic loss.

If the National Park Service was granted authority to spend federal funds to improve and maintain road corridors, then this economic burden of road maintenance would be removed from the township. If authorization was through a lease agreement, there would be a positive economic gain from lease payments.

ALTERNATIVE E: PARKWIDE EMPHASIS

IMPACTS ON NATURAL RESOURCES

The construction of proposed facilities under alternative E would result in impacts to approximately 84 acres of the northern hardwood/hemlock forest ecosystem. Approximately 14.5 acres would be restored to natural conditions. The net negative impact would be disturbance of 69.5 acres, which is 0.1 percent of the total lakeshore acreage. Construction activities would be planned to avoid impacts on areas with fragile, unique, threatened, or endangered plants or animals. Impacts on natural resources would be related to construction, use, and maintenance activities. Soils could be displaced and compacted, vegetation could be damaged or removed, and wildlife could be displaced. Use and maintenance activities would result in soil compaction and an increased potential for erosion, damage to or destruction of vegetation, displacement of wildlife around activity areas and along trails, air and water pollution from vehicle and watercraft use, and noise. Specific areas where these impacts would occur are described below.

The long-term development at Little Sand Bay of a new harbor complex, ranger station, lakeshore interpretive center, shoreline trail, and parking areas would result in impacts similar to those described under alternative D. Construction and visitor use would affect a maximum of 80 acres. As described under alternative D, the addition of fueling facilities would increase the likelihood of petrochemical accidents, including fires and spills. Periodic dredging would have impacts similar to those described under alternative A, including increased turbidity, greater nutrient concentrations, and disturbance or loss of benthic organisms and aquatic communities.

Extending the trail on Rocky Island and developing a trail on Manitou and Outer islands would impact about 3 additional acres.

Developing additional campsites and campgrounds on Oak, Michigan, York, Manitou, Hermit, Otter, Sand, and Basswood islands would cause impacts on approximately 9.5 acres of soils, vegetation, and wildlife habitat. Improvements to the Quarry Bay campground on Stockton Island and the campsites on Rocky Island would have negligible impacts.

The employee quarters would be removed on South Twin Island. This would increase the wilderness characteristics of this island but not as much as under alternative D when all facilities would be removed. The net gain in restored habitat would be 0.5 acre.

The construction of employee quarters on Rocky Island would impact approximately 0.5 acre.

Maintaining the historical landscape at selected sites, including the light stations and the Noring farmstead, would impact minor amounts of vegetation at each site.

Threatened or Endangered Species

As discussed under alternative A, the approved *Resources Management Plan* calls for the monitoring of all threatened or endangered species to ensure continued protection. The actions of this alternative would not affect threatened or endangered species recognized by the state or federal government. Measures to mitigate any potential adverse effects on bald eagles would include establishing a minimum 0.25-mile buffer

zone around nesting areas, timing construction to avoid critical reproductive periods, restricting visitor use near nesting areas, and closely monitoring visitor use within 0.25 mile of known nesting and primary feeding areas. At the time of specific site planning, further surveys would be conducted to ensure that no state or federal threatened or endangered species would be adversely affected.

Floodplains and Wetlands

The development of a harbor complex at Little Sand Bay would have a temporary adverse effect on an intermittent stream in the area because of siltation during construction. Only a trail would be constructed around the marsh area, so the impact on this wetland would be minimal and short term. There would be no long-term adverse impacts on floodplains or wetlands under this alternative.

IMPACTS ON WILDERNESS VALUES

The zoning and managing of certain portions of Apostle Islands National Lakeshore as primitive would protect the wilderness characteristics of these areas. These characteristics include the absence of permanent or obvious human presence, the absence of permanent improvements or human habitation, unimpaired ecologic or geologic features, solitude, and the opportunity for a primitive and unconfined type of recreation. Under this alternative approximately 17.5 percent of the lakeshore would be managed to provide this type of wilderness experience.

IMPACTS ON CULTURAL RESOURCES

Cultural resources would continue to be affected by general wear and tear from concentrated use, particularly on Sand, Raspberry, Oak, Manitou, Basswood, and Stockton islands. More visitor use would increase the potential for misuse and overuse of cultural resource sites; loss or destruction of historic fabric as a result of adaptive or interpretive uses of historic structures; inadvertent disturbance of archeological sites from development and maintenance facilities; and vandalism and illegal collection of resources, particularly submerged resources. Use and interpretation of sites would increase the potential for vandalism, fire, misuse, and damage to cultural resources; interpretation, however, would also help visitors understand the importance of the resources and would encourage them to help protect these resources.

Closing the light station buildings on Sand, Devils, Michigan, and Outer islands to the public and removing on-site NPS personnel would increase the potential for vandalism and site misuse, which could result in the loss of historic quality and integrity. Routine patrols and alarm systems would help mitigate adverse impacts.

Maintaining and managing landscapes and vegetation at light stations, farmsteads, and other historic properties would help maintain and perpetuate the historical integrity of these sites.

The new dock at Sand Island, the trail to the island's light station, and guided tours of the light station would encourage more visitation and increase the potential for site wear and tear, misuse, and possibly vandalism. Visitor use of the light station could cause some loss of the historic fabric. The presence of an interpreter would help prevent any possible vandalism.

The acquisition of submerged cultural resources would greatly enhance protection for these resources, but they could still be subject to vandalism and illegal collection.

Improved access to Little Sand Bay might increase the potential for degradation of the Hokenson Brothers Fishery. The development of a new harbor complex at Little Sand Bay would result in no significant cultural impacts (NPS 1978).

Archeological surveys would be undertaken before any construction activities. These surveys would provide the necessary information to avoid archeological resources or to mitigate any impacts.

IMPACTS ON VISITOR USE

The implementation of this alternative, like alternatives C and D, would help distribute visitor use among the islands and the mainland so that future crowding or overuse did not reach levels that would adversely affect the present quality of recreational opportunities on the islands. More frequent boat tours would provide nonboating visitors with improved opportunities to visit the islands. Only the light stations on Raspberry and Sand islands would be open to visitors, and guided interpretive tours at the Sand Island light station would offer a new interpretive opportunity for visitors. New trails on some islands would provide additional recreational activities.

The development of camping, hiking, interpretive, and winter recreational opportunities on the mainland would encourage more year-round use. Visitation would be expected to increase, and visitors would spend more time in the area using the additional facilities at Little Sand Bay. Kiosks in surrounding communities would provide information to potential visitors. Development of a harbor/breakwater facility at Little Sand Bay would provide the boating public with a harbor of refuge on the west side of the Bayfield Peninsula.

IMPACTS ON THE SOCIOECONOMIC ENVIRONMENT

Alternative E would increase visitation in Bayfield and Ashland counties by an unknown amount. On a controlled, long-term basis increased visitation would create new jobs, stimulate development, and produce additional income in the local communities. The effect of increased visitation would be even more positive for the local economy if tourism developed into a year-round industry instead of being just a seasonal phenomenon. Development of a tourist industry would be consistent with the overall development goals of the Red Cliff Band of the Chippewa. Some residents would dislike any localized intrusions on the peace and solitude now found in the area.

As described under alternative A, NPS staff would continue to purchase goods and services from local businesses, for both government and private use, and this would have a minor, long-term positive impact on the local economy. Construction projects would provide short-term economic benefits to local communities if local residents were hired and if materials were purchased from local distributors.

The property tax base would decrease with the purchase of about 200 acres of private property. The current tax rate is $4 per acre. The federal government would make payments in lieu of taxes to mitigate this loss.

Depending on the amount of interest ultimately acquired by the National Park Service, a maximum of about 300 acres of second-growth mixed hardwoods would no longer be

available for pulpwood harvest, resulting in some economic loss. Land values vary from year to year, but they currently run about $125 to $200 per acre. Purchase or lease of this property, along with the acquisition of outstanding mineral rights, would offset any short-term economic loss.

The expenditure of federal funds to improve and maintain local road corridors would remove the economic burden of road maintenance from the township. If the expenditure was through a lease agreement, there would be a positive economic gain from lease payments.

MINIMUM REQUIREMENTS ALTERNATIVE

The impacts of the minimum requirements alternative would be similar to but less extensive than those under alternative E. This alternative would result in approximately 38.5 additional acres of new disturbance. Approximately 14.5 acres would be restored to natural conditions. The net negative impact would be disturbance of 24 acres, which is 0.04 percent of the total lakeshore acres. Areas impacted would be within the northern hardwood/hemlock forest ecosystem. Proposed construction would avoid areas containing sensitive or unique plant communities, wetlands, floodplains, or critical, threatened, or endangered species habitat.

Table 18: Summary of Environmental Consequences

Impact Topic	Alternative A – Existing Conditions	Alternative B – Primitive Emphasis	Alternative C – Island Emphasis	Alternative D – Mainland Emphasis	Alternative E – Parkwide Emphasis
Natural Resources					
•Vegetation	Continued minor impacts on approximately 238 acres of northern hardwood/hemlock forest; no significant impacts on floodplains or wetlands	New disturbance of 2 acres of northern hardwood/hemlock forest, offset by 2 acres restored to natural conditions; no significant impacts on floodplains or wetlands	New disturbance of 41 acres of northern hardwood/hemlock forest; 1 acre restored to natural conditions; net new disturbance of 40 acres (0.06% of lakeshore); no significant impacts on floodplains or wetlands	New disturbance of 64 acres of northern hardwood/hemlock forest; 15 acres restored to natural conditions; net new disturbance of 49 acres (0.07% of lakeshore); no significant impacts on floodplains or wetlands	New disturbance of 84 acres of northern hardwood/hemlock forest; 14.5 acres restored to natural conditions; net new disturbance of 69.5 acres (0.1% of lakeshore); no significant impacts on floodplains or wetlands
•Wildlife	No new effects	Temporary wildlife displacement during construction and maintenance activities; no impacts on threatened or endangered wildlife species	Similar to alternative B except impacts spread over a greater area	Similar to alternative C, except most mainland impacts concentrated at Little Sand Bay	Similar to alternative D
Cultural Resources	Continued impacts of visitor use at six light stations; potential for vandalism and illegal collection of underwater cultural resources because of no formal protection; identification of underwater resources through resource study; continued preservation of sites on National Register; other sites protected according to significance	Potential for misuse and overuse of cultural resources on three islands because of greater visitor use; four light stations closed to visitors, resulting in less wear and tear; protection of resources on all islands more difficult because of limited staff; better protection of underwater resources because of resource study and agreement with state to allow NPS protection activities; continued preservation of sites on National Register; other sites protected according to significance	Potential for misuse and overuse of cultural resources on seven islands because of greater visitor use; four light stations closed to visitor use, resulting in less wear and tear; integrity of historic sites perpetuated by maintaining historic landscapes; improved protection of submerged cultural resources because of resource study plus NPS acquisition of lake bottom lands and enforcement activities	Similar to alternative C except potential for effects on six islands; improved protection of submerged cultural resources because of resource study plus NPS acquisition and enforcement activities	Similar to alternative D except improved protection of submerged cultural resources because of NPS acquisition or agreement with the state to allow NPS protection activities

Impact Topic	Alternative A – Existing Conditions	Alternative B – Primitive Emphasis	Alternative C – Island Emphasis	Alternative D – Mainland Emphasis	Alternative E – Parkwide Emphasis
Visitor Use	No change in visitor use; tour boat access limited to three islands; public access to other islands difficult and expensive; no change in interpretive programs	Same as alternative A except improved visitor introduction to lakeshore because of expanded facilities at Bayfield; few effects of closing four light stations	Better distribution of visitor use among islands, so little crowding or overuse; tour boat access provided to seven islands, increasing visitor opportunities; few effects of closing four light stations; better resource-related mainland activities because of new visitor contact station at Little Sand Bay	Similar to alternative C except tour boat access provided to six islands; more year-round activities on mainland, especially at Little Sand Bay, resulting in increased visitor use improved safety for boaters with development of Little Sand Bay harbor	Similar to alternative D, plus guided interpretive tour at Sand Island light
Socioeconomic Environment	Slight benefit to local economies from increased visitation (if any) and local NPS purchases of goods and services	Similar to alternative A, plus short-term local economic benefits from construction	Greater short- and long-term local economic benefits because of increased construction and tourist expenditures; minor long-term local benefit because of local NPS purchases of goods and services; potential for more parking, traffic flow, and law enforcement problems in mainland towns and cities; benefits to local townships if National Park Service can finance local road improvements	Similar to alternative C, plus potential conflicts with local fishing industry because of additional recreational boating on Lake Superior; minor impacts on local tax base due to NPS acquisition of private lands, which would be partially mitigated through payments in lieu of taxes	Similar to alternative D

CONSULTATION AND COORDINATION

The following agencies have been consulted in the development of this *General Management Plan / Environmental Assessment.*

Federal Agencies

Advisory Council on Historic Preservation
U.S. Department of the Interior
    Bureau of Indian Affairs
    Fish and Wildlife Service

Wisconsin State Agencies

Department of Natural Resources
Division of State Energy and Coastal Management
Division of Tourism
State Historic Preservation Officer
State Historical Society
University of Wisconsin, Department of Urban and Regional Planning

Local and Regional Agencies and Organizations

Great Lakes Indian Fish and Wildlife Commission
Lake Superior Chippewa Indians
    Bad River Band
    Red Cliff Band
Northwest Wisconsin Regional Planning Commission
Sigurd Olson Environmental Institute

APPENDIXES / BIBLIOGRAPHY / PLANNING TEAM & CONSULTANTS

An Act to provide for the establishment of the Apostle Islands National Lakeshore in the State of Wisconsin, and for other purposes. (84 Stat. 880)

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That, in order to conserve and develop for the benefit, inspiration, education, recreational use, and enjoyment of the public certain significant islands and shoreline of the United States and their related geographic, scenic, and scientific values, there is hereby established the Apostle Islands National Lakeshore (hereinafter referred to as the "lakeshore") in Ashland and Bayfield Counties, Wisconsin, consisting of the area generally depicted on the map entitled "Apostle Islands National Lakeshore", numbered NL–AI–91,000, sheets 1 and 2, and dated June 1970. The map shall be on file and available for public inspection in the office of the Director, National Park Service, Department of the Interior.

SEC. 2. No lands held in trust by the United States for either the Red Cliff Band or Bad River Band of the Lake Superior Chippewa Indians, or for allottees thereof, shall be acquired or included within the boundaries of the lakeshore established by this Act, with the following exception:

> If the Indians who own more than 50 per centum of the interest in allotment number 74 GL or allotment number 135 in the Red Cliff Reservation agree to sell the allotment to the Secretary of the Interior (hereinafter referred to as the "Secretary"), the Secretary may consent to the sale on behalf of the other owners, purchase the allotment for the negotiated price and revise the boundaries of the lakeshore to include the allotment.

SEC. 3. The Secretary may acquire within the boundaries of the lakeshore lands and interests therein by donation, purchase with donated or appropriated funds, or exchange, but lands and interests in lands owned by the State of Wisconsin may be acquired only by donation. Notwithstanding any other provision of law, any Federal property located within the boundaries of the lakeshore may, with the concurrence of the agency having custody thereof, be transferred without transfer of funds to the administrative jurisdiction of the Secretary for the purposes of the lakeshore.

SEC. 4. (a) With the exception of not more than eighty acres of land to be designated within the lakeshore boundaries by the Secretary as an administrative site, visitor center, and related facilities, as soon as practicable, any owner or owners of improved property on the date of its acquisition by the Secretary may, as a condition of such acquisition, retain for themselves and their successors or assigns a right of use and occupancy of the improved property for noncommercial residential purposes for a definite term not to exceed twenty-five years, or, in lieu thereof, for a term ending at the death of the owner, or the death of his spouse, whichever is the later. The owner shall elect the term to be reserved. The Secretary shall pay to the owner the fair market value of the property on the date of such acquisition less the fair market value on such date of the right retained by the owner.

(b) A right of use and occupancy retained pursuant to this section may be terminated with respect to the entire property by the Secretary upon his determination that the property or any portion thereof has ceased to be used for noncommercial residential or for agricultural purposes, and upon tender to the holder of a right an amount equal to the fair market value, as of the date of the tender, of that portion of the right which remains unexpired on the date of termination.

(c) The term "improved property", as used in this section, shall mean a detached, noncommercial residential dwelling, the construction of which was begun before January 1, 1967 (hereinafter referred to as "dwelling"), together with so much of the land on which the dwelling is situated, the said land being in the same ownership as the dwelling, as the Secretary shall designate to be reasonably necessary for the enjoyment of the dwelling for the sole purpose of noncommercial residential use, together with any structures accessory to the dwelling which are situated on the land so designated.

SEC. 5. The Secretary shall permit hunting, fishing, and trapping on lands and waters under his jurisdiction within the boundaries of the lakeshore in accordance with the appropriate laws of Wisconsin and the United States to the extent applicable, except that he may designate zones where, and establish periods when, no hunting, trapping, or fishing shall be permitted for reasons of public safety, administration, fish or wildlife management, or public use and enjoyment. Except in emergencies, any regulations prescribing any such restrictions shall be put into effect only after consultation with the appropriate State agency responsible for hunting, trapping, and fishing activities.

SEC. 6. The lakeshore shall be administered, protected, and developed in accordance with the provisions of the Act of August 25, 1916 (39 Stat. 535; 16 U.S.C. 1, 2–4), as amended and supplemented; and the Act of August 25, 1916 (39 Stat. 535; 16 U.S.C. 1, 2–1), as April 9, 1924 (43 Stat. 90; 16 U.S.C. 8a et seq.), as amended, except that any other statutory authority available to the Secretary for the conservation and management of natural resources may be utilized to the extent he finds such authority will further the purposes of the Act.

SEC. 7. In the administration, protection, and development of the lakeshore, the Secretary shall adopt and implement, and may from time to time revise, a land and water use management plan which shall include a specific provision for—

(a) protection of scenic, scientific, historic, geological, and archeological features contributing to public education, inspiration, and enjoyment;

(b) development of facilities to provide the benefits of public recreation together with such access roads as he deems appropriate; and

(c) preservation of the unique flora and fauna and the physiographic and geologic conditions now prevailing on the Apostle Islands within the lakeshore: *Provided*, That the Secretary may provide for the public enjoyment and understanding of the unique natural, historical, scientific, and archeological features of the Apostle Islands through the establishment of such trails, observation points, exhibits, and services as he may deem desirable.

SEC. 8. There are authorized to be appropriated not more than $4,250,000 for the acquisition of lands and interests in lands and not more than $5,000,000 for the development of the Apostle Islands National Lakeshore.

Approved September 26, 1970.

Legislative History

House Report No. 91–1280 accompanying H.R. 9306 (Committee on Interior and Insular Affairs).
Senate Report No. 91–276 (Committee on Interior and Insular Affairs).
Congressional Record:
Vol. 115 (1969): June 26, considered and passed Senate.
Vol. 116 (1970):
Sept. 10, considered and passed House, amended, in lieu of H.R. 9306.
Sept. 16, Senate concurred in House amendment.

An Act

To authorize the inclusion of certain additional lands within the Apostle Islands National Lakeshore.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

The Act of September 26, 1970 (Public Law 91-424; 16 U.S.C. 460w) is amended as follows:

(1) In section 1—

(a) in the first sentence, after the phrase "consisting of", insert: ": (a) IN GENERAL—";

(b) at the end of the first sentence, delete "1970" and insert: "1970; and

"(b) LONG ISLAND ADDITION.—Approximately 200 acres of land at the mouth of Chequamegon Bay known as "Long Island", as depicted on the map numbered NL-AI-91,001 and dated December, 1985.";

(c) in the last sentence, delete "map" and insert "maps".

(2) In section 3, after the word "donation.", strike the following sentence and insert in lieu thereof the following: "Notwithstanding any other provision of law, any Federal property located within the boundaries of the lakeshore is hereby transferred without transfer of funds to the administrative jurisdiction of the Secretary for the purposes of the lakeshore: *Provided*, That the United States Coast Guard may retain a right to utilize a portion of such land and facilities for use as navigational aids so long as may be required.".

(3) In section 4(c), after "January 1, 1967", insert: ", or before January 1, 1985 for those lands referred to in section 1(b)".

(4) Section 8 of such Act is amended by adding the following at the end thereof: "Effective October 1, 1986, there are authorized to be appropriated such additional sums as may be necessary for the acquisition of the lands described in section 1(b).".

APPENDIX B: MANAGEMENT OBJECTIVES

CULTURAL RESOURCE MANAGEMENT

Identify, inventory, preserve, protect, and interpret to the public the lakeshore's cultural resources in accordance with legislative and executive requirements and NPS historic preservation policies.

- Establish baseline data for cultural resources, including archeological sites, historic light stations, quarries, logging camps, fishing sites, farmsteads, and submerged resources.
- Conduct a research and resource monitoring program to provide information for the management and interpretation of cultural resources.
- Preserve and maintain historic structures, landscapes, and objects at National Register sites.
- Provide for visitor use and enjoyment of cultural sites without impairing resource integrity.
- Complete essential resource studies: historic resource study; historic structure reports for light stations; furnishings plan for Raspberry Island light station; preservation guides for light stations, Hokenson Brothers Fishery, and Manitou Camp; archeological field studies; legislative/administrative history.

NATURAL RESOURCE MANAGEMENT

Study, protect, interpret, and manage the lakeshore's natural resources in accordance with legislative and executive requirements and the NPS *Management Policies*. Ensure that the natural resource management plan is updated on a regular basis to address the following:

shoreline environments, including sandspits, beachlines, and their relationships to erosion and beach-building processes

habitats of native plants and animals

the proliferation of plants and animals owing their existence to human intervention

plants and animals and their habitats that have been eliminated or severely altered because of the actions of humans during the past 300 years

aquatic resources in Lake Superior

acid deposition and air transport of contaminants

Rehabilitate, where appropriate, resources and processes recently altered by human activities. Use natural or simulated natural processes wherever possible; natural processes may, however, be modified to protect the integrity of certain cultural resources.

Provide for visitor use and facility development in an ecologically sound manner.

If problems are identified, ensure through an ongoing monitoring program and subsequent mitigation that the water quality of Lake Superior is not diminished by the National Park Service or visitor use (use ca. 1970 as the base year).

Manage islands found to be suitable for wilderness designation under the Wilderness Act of 1964 so as not to impair their wilderness qualities, pending congressional consideration of wilderness designation.

VISITOR USE AND RECREATION

Identify, provide for, interpret, and regulate appropriate recreational uses in a manner consistent with the protection of scenic, natural, and cultural resources, and existing land use reservations.

- Provide access and facilities within the lakeshore to permit and manage uses such as hiking, camping, fishing, hunting, and boating.
- Provide visitor services required to manage and protect the area for year-round use.
- Provide access and services for handicapped visitors.

VISITOR ORIENTATION

Assist area visitors in safely using the lakeshore and surrounding region by providing adequate information on the resources, recreation, services, and facilities.

INTERPRETATION

Interpret the lakeshore's natural and cultural resources and their significance as an interrelated, evolving environment.

Develop and provide interpretation for various scopes of interests, including broad concepts, in-depth specific interpretive information, and environmental education. Emphasis will be on themes and subthemes, including the following:

glacial geology and stratigraphy
existing and prehistoric vegetation and wildlife types
aquatic resources
modern, historic, and prehistoric human occupation and use of the area
recreational uses
environmental concerns
safety

Continue the cooperative relationship with Eastern National Park and Monument Association, with outlets at stations on the mainland and the islands.

Assist and encourage other groups in the interpretation of local and native resources.

SAFETY

Provide for the safety of visitors, residents, and employees of Apostle Islands National Lakeshore by establishing and maintaining an occupational safety and health program compatible with the requirements of Executive Order 12196.

- Stress water safety through enforcement, information, orientation, inspections, and interpretation.
- Identify and publicize specific and general winter safety hazards of the area.
- Cooperate with other agencies such as the U.S. Coast Guard, Wisconsin Department of Natural Resources, and sheriffs of Bayfield and Ashland counties to provide better water safety.
- Comply with OSHA standards wherever they apply to work facilities and conditions and to visitor use.

CONCESSIONS

Provide through concession permits or contracts the opportunities and the means for people to visit the islands in a safe, inexpensive, energy-efficient, and environmentally desirable manner. Also, provide a regularly scheduled transit system throughout the islands.

DEVELOPMENT

Ensure that area development is adequate to provide for efficient and essential area administration, protection, interpretation, maintenance, and visitor services.

- Provide a mainland base (or bases) for NPS and concessioner operations to serve the lakeshore. Primary bases will be Little Sand Bay and Bayfield.
- Provide ranger stations and interpretive and maintenance facilities on the islands to allow for compatible uses and proper resource management and visitor protection.

MAINTENANCE

Maintain the area's roads, docks, trails, buildings, historic structures, grounds, utilities, facilities, and resources in a manner that will be efficient, safe, and compatible with visitor use and resource management and protection.

OPERATIONS

Manage the area through a superintendent and organizational structure that will provide the most efficient operation of the lakeshore.

ACQUISITION OF INFORMATION

Encourage and administer research and data-collecting activities to provide better bases for the management of resources, visitor use, and interpretation and for visitor and resource protection.

LANDS

Secure through acquisition, boundary adjustments, or other means, a land base that is adequate to manage, interpret, and protect the area's significant natural, cultural, and recreational resources.

COOPERATION

Cooperate with federal, state, tribal, and local agencies; private organizations; educational institutions and interests; and members of the public to ensure that

land uses in the area and its immediate vicinity have minimal adverse effects on area resources and the experience of area visitors

recreational opportunities and public services in the area and its environs are coordinated in a manner that minimizes within-area development and unnecessary duplication of facilities and services

visitor resource protection is accomplished with a minimum of duplication between agencies

APPENDIX C: WATER TRANSPORTATION ANALYSIS

The number of tour boat users at Apostle Islands National Lakeshore has averaged nearly 16,000 since 1976. Table C-1 contains figures for actual ridership, the average trend in ridership, and the relationship of ridership to total lakeshore visitation. If ridership alone is considered, there has been an average increase of 1 percent per year. When related to total park visitation, ridership has averaged 15.3 percent of total visitation. Furthermore, the average rate of change in ridership as it relates to park visitation has decreased 4.8 percent per year. In contrast, park visitation has increased at an average rate of 7 percent per year.

Table C-1: Tour Boat Ridership

Year	Lakeshore Visitation	Percentage Change	Boat Ridership	Percentage Change	Percentage of Total Visitation	Percentage Change Relative to Percentage of Total Visitation
1976	71,057		15,497		22	
1977	89,992	27	15,084	-3	17	-23
1978	88,126	-2	16,216	7	18	6
1979	75,629	-14	13,423	-18	18	0
1980*	88,467	17	-	-	-	-
1981	103,960	18	15,445	15	15	-17
1982	125,756	21	14,890	-4	12	-20
1983	130,913	4	21,311	28	16	33
1984	127,300	-3	15,903	-25	13	-19
1985	117,353	-8	15,512	-3	13	0
1986	113,621	-3	14,999	-3	13	0
1987	137,481	21	15,849	6	12	-8
Average change:		7		1	15.3	-4.8

Projections for 1997: 270,500 visits, 25,000 boat passengers**

* Tour boat did not operate.
**Park visitation projected to increase by 7 percent per year. Boat ridership calculated by applying the decrease of 4.8 percent per year to the average percentage of total visitation (15.3%). The result is that if this rate of decrease continues, then ridership will be 9.2 percent of park visitation.

If ridership does not increase to compensate for increases in operational costs, then fares must be increased and the frequency of trips decreased for the concession to remain profitable. It is possible that the tour boat fare is already too high ($15.95 for adults and $8.50 for children) for many lakeshore visitors, especially families, to use this service.

The availability of the tour boat service both in terms of affordable fares and convenience (i.e., frequency of tours and desirable tour routes) is a critical factor in increasing ridership and giving more visitors the opportunity to visit the lakeshore islands. The operating season is approximately 100 to 120 days, depending on the weather.

Because boats and boat operation are very expensive and the operating season is very short, it is difficult or impossible for a concessioner to operate an affordable, convenient tour boat service on a self-sustaining basis. This analysis compares the costs (developed based on 1988 costs) of water transportation as proposed in each alternative and shows the annual operating costs for three different ownership and operation scenarios. The cost of alternative A is based on continued use of the boats now owned by the concessioner. In alternatives B through E, the costs are based on the purchase of new boats that have a capacity of 90 to 100 passengers and running speeds of 20 to 22 miles per hour.

Boat Operation Scenarios

Tables C-2, C-3, and C-4 show the operating costs under each alternative and the cost per passenger based on estimated ridership, using 1987 visitation and ridership, and 1988 costs. They also compare the estimated ridership with the ridership needed to maintain a fare of $16 per adult passenger. Under alternative A (no-action alternative) ridership is assumed to remain at 16,000 per year. Alternative B would offer the same service as the no-action alternative, so ridership would probably remain the same. Estimated ridership for alternatives C, D, and E was derived by taking an average of the three projections, as shown in table C-5.

NPS Ownership and Concession Operation. Under this scenario the National Park Service would purchase and own the boats, and a concessioner would operate the boats and tour service through a concession contract with the Park Service. The concessioner would pay the Park Service a certain percentage of the income from the tour boat service. Boat costs would be approximately $30,000 per year per boat (based on a 20-year straight-line depreciation schedule). The estimated operation and maintenance cost for the concessioner would be $160 per hour. (See table C-2.)

Table C-2: NPS Ownership and Concession Operation

Alternative	Total Estimated Cost	Estimated Ridership	Cost per Passenger	Ridership Required to Maintain a $16 Charge per Passenger
A	N/A	16,000	N/A	N/A
B	N/A	16,000	N/A	N/A
C	728,320	30,000	24.78	45,520
D	380,480	20,000	19.02	23,780
E	514,000	27,900	18.40	32,125

NPS Ownership and Operation. For this scenario the Park Service would own and operate the boats and the tour boat service. Boats are assumed to cost $600,000 each. A 20-year straight-line depreciation schedule would result in an annual cost of $30,000 per boat. Operation and maintenance costs for the Park Service are estimated to be $130 per hour. (See table C-3.)

Table C-3: NPS Ownership and Operation

Alternative	Total Estimated Cost	Estimated Ridership	Cost per Passenger	Ridership Required to Maintain a $16 Charge per Passenger
A	N/A	16,000	N/A	N/A
B	N/A	16,000	N/A	N/A
C	614,260	30,000	20.48	38,393
D	331,640	20,000	16.58	20,728
E	434,500	27,900	15.57	27,156

Concessioner Ownership and Operation. Under this scenario the concessioner would purchase, own, and operate the boats and tour boat service. Again, boats are assumed to be $600,000 each, except under alternative A. Assuming a 20-year life, 11 percent interest rate, and 15 percent salvage rate, the annual cost for each boat would be about $73,960. The estimated operation and maintenance costs for the concessioner would be $160 per hour. (See table C-4.)

Table C-4: Concessioner Ownership and Operation

Alternative	Total Estimated Cost	Estimated Ridership	Cost per Passenger	Ridership Required to Maintain a $16 Charge per Passenger
A*	200,000 – 250,000	16,000	12.50 – 15.65	13,300 – 16,670
B	318,960	16,000	19.94	19,935
C	904,160	30,000	30.14	56,510
D	408,400	20,000	20.42	25,525
E	645,188	27,900	23.13	40,324

* Assumes use of existing boats.

Summary

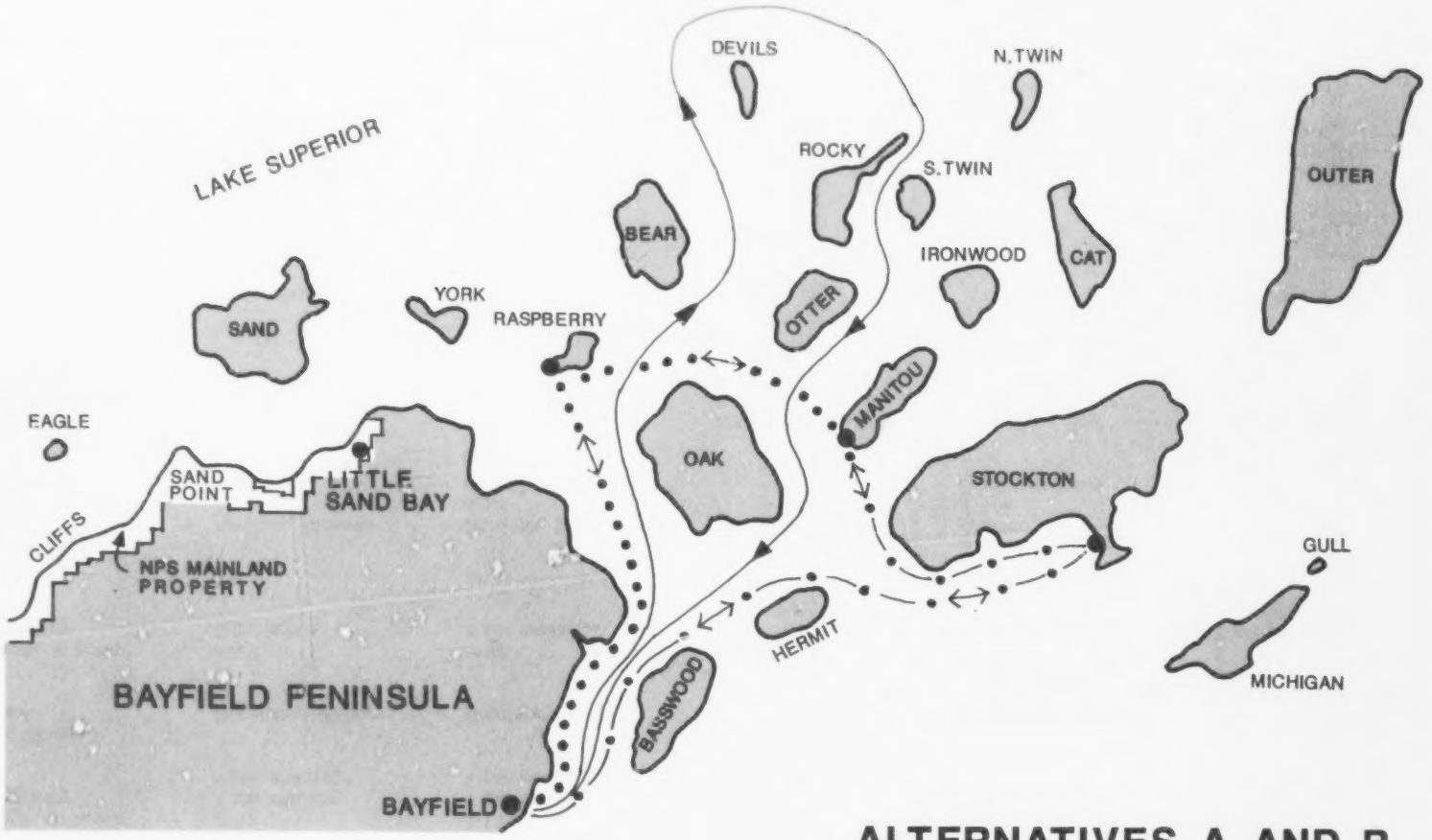
Table C-5 summarizes services and costs for each alternative. The tour routes depicted on the maps and in the table are simply one way to implement the alternative, and they have been used here as a basis to develop costs. Actual tour routes would probably be similar, but they would be defined and reviewed periodically by the National Park Service to ensure that they meet management objectives and resource protection considerations.

It is obvious that in nearly all cases, some form of subsidization by the federal government would be necessary to implement most of the action alternatives. Implementation of any of the various alternatives would depend on further study of legal and financial issues.

Table C-5: Tour Boat Service and Cost

Tour	Alternative A: No Action	Alternative B: Primitive Emphasis	Alternative C: Island Emphasis	Alternative D: Mainland Emphasis	Alternative E: Parkwide Emphasis
Grand					
Stops	None	None	Outer, Stockton, Manitou	Stockton, Manitou	Stockton, Manitou
Length, in hours*	2-1\2	2-1/2	5	3-3/4	3-3/4
Frequency	1 per morning, 1 per afternoon	1 per morning, 1 per afternoon	2 per morning, 1 per afternoon	1 per morning	1 per morning, 1 per afternoon
Island Shuttle					
Stops	Raspberry, Manitou	Raspberry, Manitou	Basswood, Sand (2), Raspberry, Oak, Little Sand Bay	Basswood, Sand (2), Raspberry, Oak, Little Sand Bay	Basswood, Sand, Raspberry, Oak, Little Sand Bay
Length, in hours*	4-1/2	3-1/2	6	6	5
Frequency	3 per week	3 per week	2 per morning, 1 per afternoon (4 hrs)	1 per morning	2 per morning, 1 per afternoon
Island Shuttle					
Stops	Stockton, Manitou	Stockton, Manitou	—	Stockton	—
Length, in hours*	5	4-1/4	—	2-1/4	—
Frequency	4 per week	4 per week	—	1 per afternoon	—
Sunset Cruise					
Stops	—	—	Little Sand Bay	Little Sand Bay	Little Sand Bay
Length, in hours*	—	—	3-3/4	3-3/4	3-3/4
Frequency	—	—	2 per week (evening)	4 per week (evening)	2 per week (evening)
Number of Boats Needed	2 (use existing)	2 new boats	4 new boats	2 new boats	3 new boats
Total Operating Time per Season	1,160 hours	1,069 hours	3,802 hours	1,628 hours	2,650 hours
Annual Operating Costs					
NPS/Concession [Total]	— [N/A]	— [N/A]	$120,000/$608,320 [$728,320]	$60,000/$320,480 [$380,480]	$90,000/$424,000 [$514,000]
NPS	N/A	N/A	$614,260	$331,640	$434,500
Concession	$200,000 – $250,000**	$318,960	$904,160	$408,400	$645,188

* Times rounded to the nearest quarter hour.
** Costs in 1983-1986 were approximately $200,000 per year. In 1987 costs increased to approximately $250,000.



GRAND TOUR (2 trips per day;1 morning,1 afternoon)

INNER ISLAND SHUTTLE (3 trips per week)

STOCKTON SHUTTLE (4 trips per week)

TOUR BOAT STOP

ALTERNATIVES A AND B

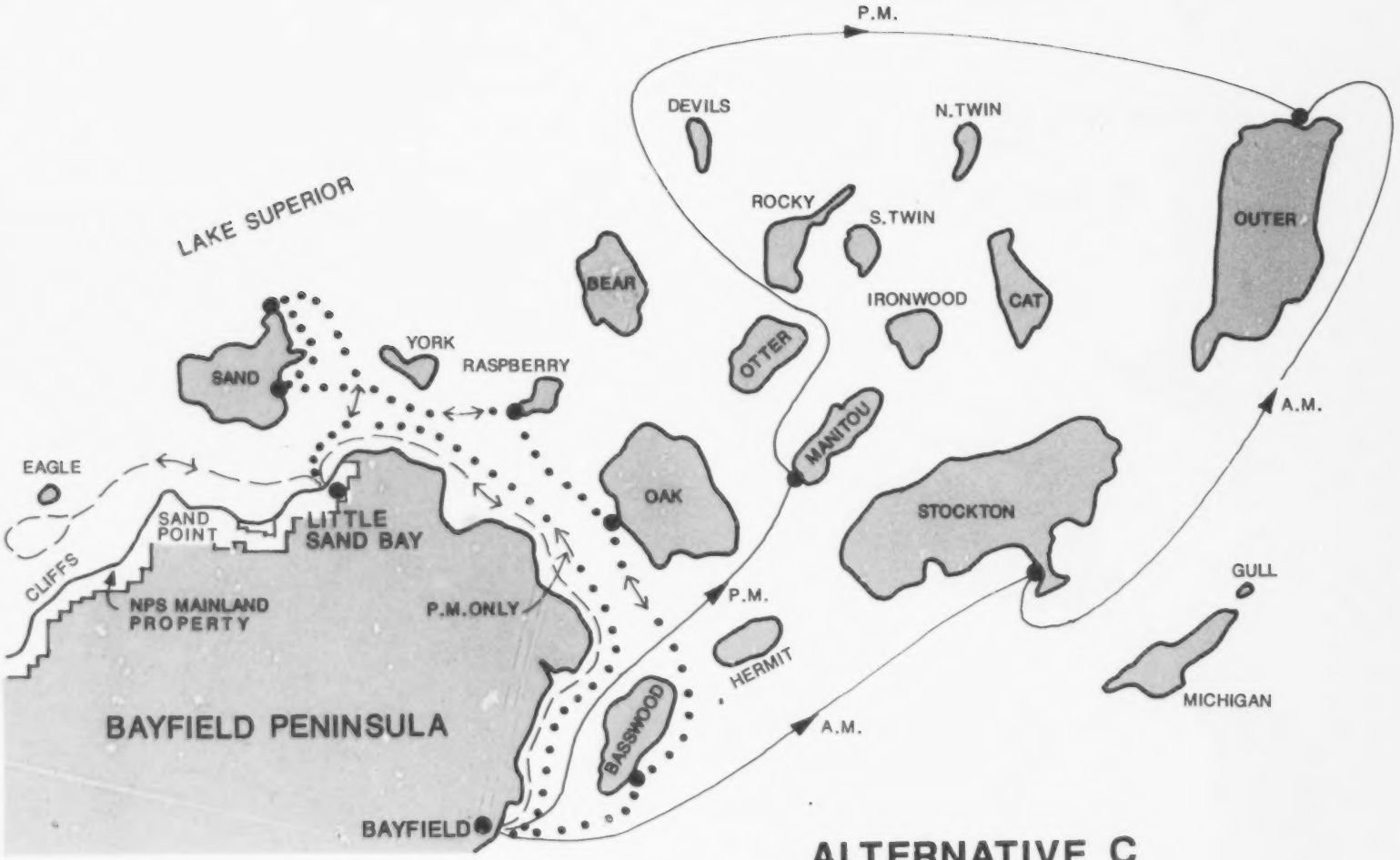
PARK GENERAL TYPICAL TOUR BOAT ROUTES

APOSTLE ISLANDS NATIONAL LAKESHORE

0 1 2 3 4 5 MILES

N

633 | 20,033
DSC | SEPT 88



GRAND TOUR/SHUTTLE (3 trips per day; 2 morning, 1 afternoon)

INNER ISLAND SHUTTLE (3 trips per day; 2 morning, 1 afternoon)

SUNSET CRUISE (2 trips per week in evening)

TOUR BOAT STOP

ALTERNATIVE C

PARK GENERAL TYPICAL TOUR BOAT ROUTES

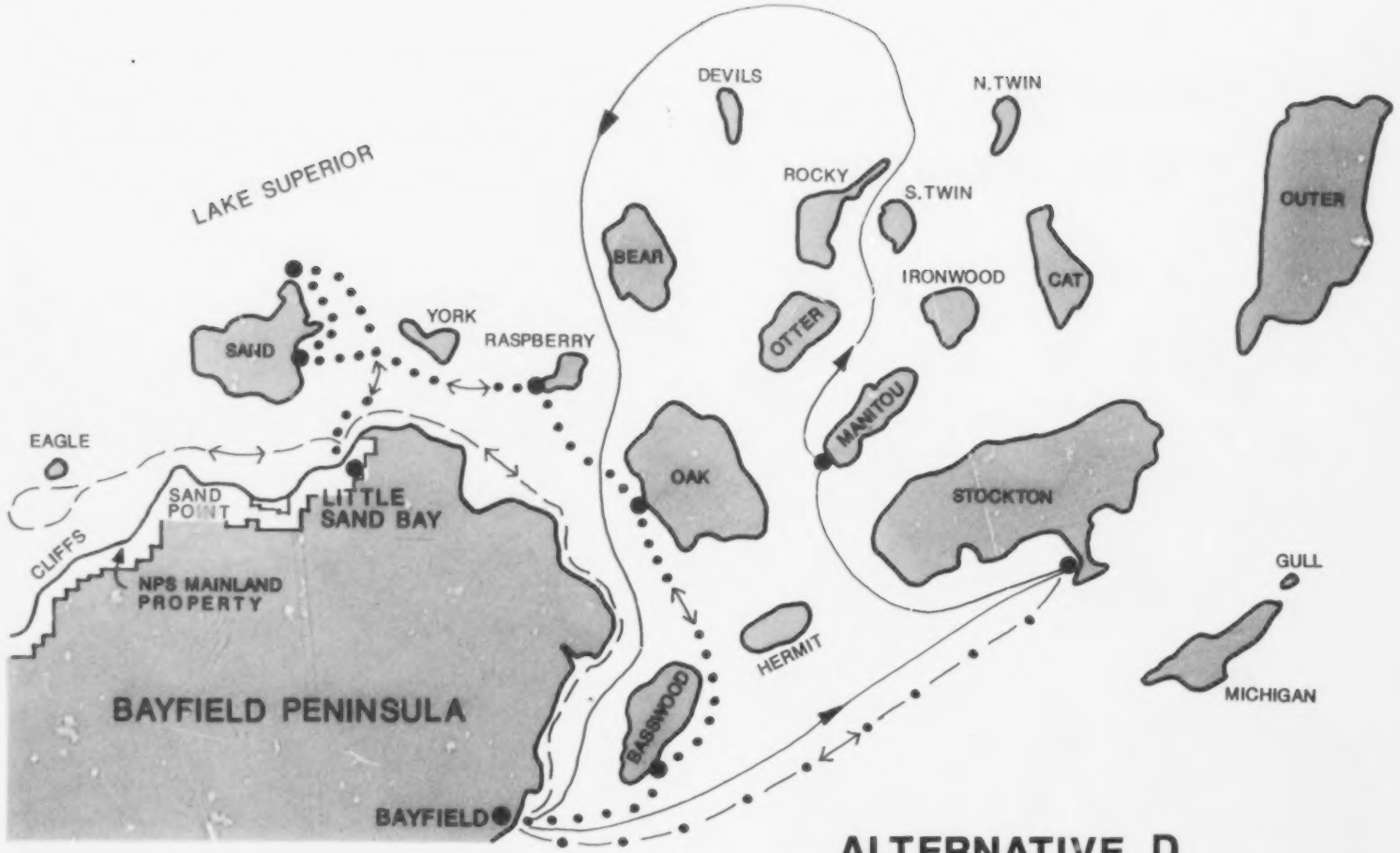
APOSTLE ISLANDS NATIONAL LAKESHORE

0 1 2 3 4 5 MILES

N

633 | 20,034

DSC | SEPT 88



GRAND TOUR (1 trip per day in morning)

INNER ISLAND SHUTTLE 1 trip per day in morning)

STOCKTON SHUTTLE (1 trip per day in afternoon)

SUNSET CRUISE (4 trips per week in evening)

TOUR BOAT STOP

ALTERNATIVE D

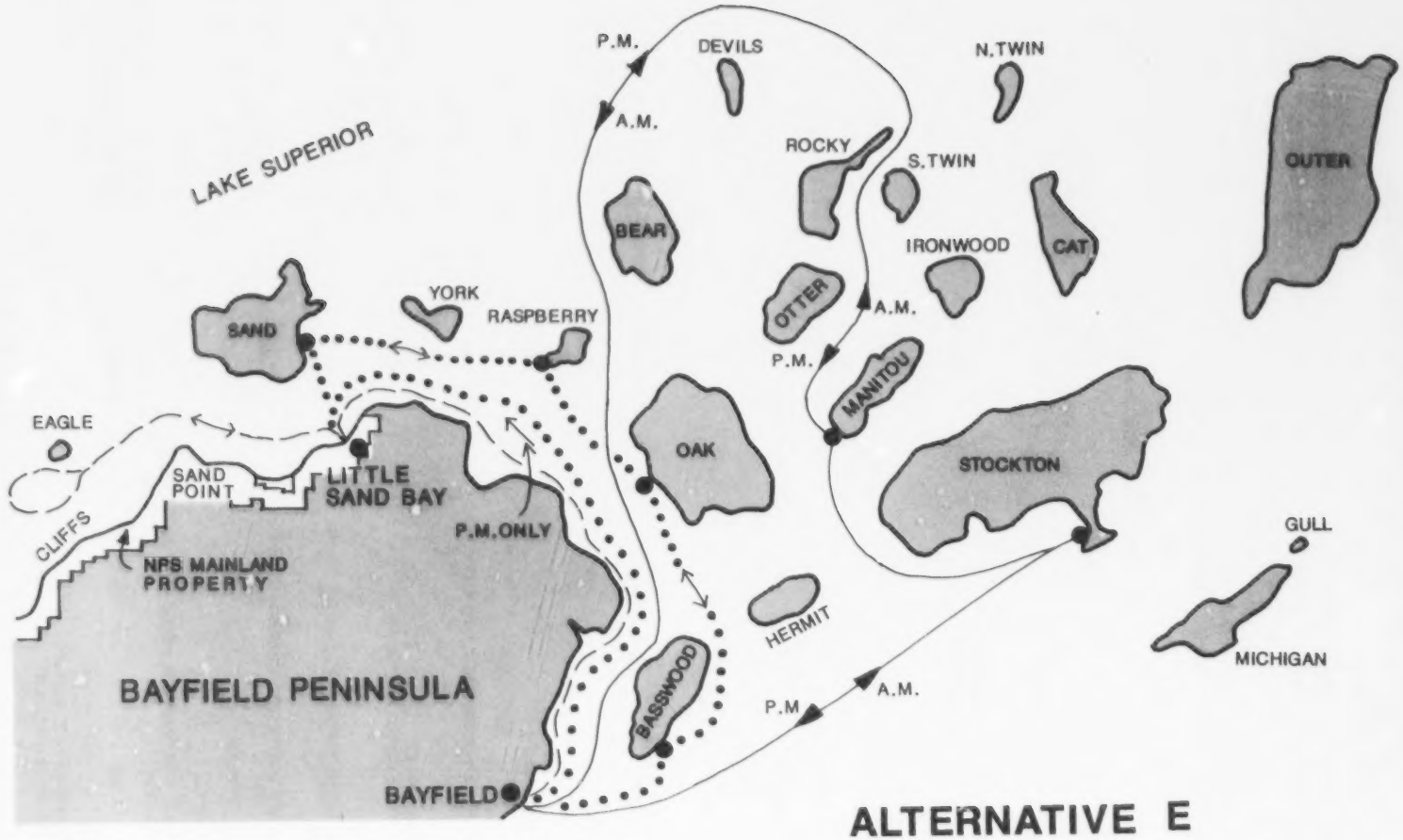
PARK GENERAL TYPICAL TOUR BOAT ROUTES

APOSTLE ISLANDS NATIONAL LAKESHORE

0 1 2 3 4 5 MILES

N

633	20,035
DSC	SEPT 88



GRAND TOUR (2 trips per day; 1 morning, 1 afternoon)

INNER ISLAND SHUTTLE (3 trips per day; 2 morning, 1 afternoon)

SUNSET CRUISE (2 trips per week in evening)

TOUR BOAT STOP

ALTERNATIVE E

PARK GENERAL TYPICAL TOUR BOAT ROUTES

APOSTLE ISLANDS
NATIONAL LAKESHORE

0 1 2 3 4 5 MILES

N

633 | 20,036
DSC | SEPT 88

APPENDIX D: COST ESTIMATES AND STAFFING

Development costs are gross, class C estimates. They are conceptual in nature for the purposes of long-range programming and budgeting. They include not only construction cost estimates, but also costs for project planning, project supervision, and contingencies. These cost estimates will be refined for each project at the preliminary design stage. These cost estimates do not include actions described and proposed in the *Resources Management Plan.* Costs for interpretive media will be determined when a media plan has been prepared.

Table D-1: Alternative Cost Estimates

Alternative B – Primitive Emphasis	Gross Construction Cost*	Advance and Project Planning Cost**	Total Project Cost
Bayfield			
Develop interpretive film/exhibits	$ 31,000	$ 8,000	$ 39,000
Develop small interpretive center (600 sq ft)	80,000	15,000	95,000
Meyers Road			
Gravel Meyers Roads (0.25 mi)	13,000	2,000	15,000
Construct parking area (15-20 cars)	26,000	5,000	31,000
Raspberry Island			
Remove campsites (2)	3,000	1,000	4,000
Prepare historic structure report/light station furnishings study		30,000	30,000
Stockton Island			
Construct boardwalk (4' wide, 200' long)	9,000	2,000	11,000
Provide wayside exhibits (3)	12,000	3,000	15,000
Sand Island			
Rehabilitate light station exterior	100,000	19,000	119,000
Basswood			
Construct trail (1.5 mi)	39,000	8,000	47,000
Otter Island			
Conduct dock study	20,000	4,000	24,000
South Twin			
Remove seasonal quarters/district ranger station	4,000	1,000	5,000
Rocky Island			
Remove campsites (7)	3,000	1,000	4,000
Remove ranger residence (300 sq ft)	3,000	1,000	4,000
Devils Island			
Rehabilitate light station exterior; stabilize interior	131,000	25,000	156,000
Outer Island			
Rehabilitate light station exterior/stabilize interior	131,000	25,000	156,000
Subtotal	**$605,000**	**$150,000**	**$ 755,000**
Public transportation costs (annual operating costs–concession ownership and operation)			319,000
Total	**$605,000**	**$150,000**	**$1,074,000**

* Net construction cost plus 31 percent.
**25 percent of net construction cost.

Alternative C – Island Emphasis	Gross Construction Cost*	Advance and Project Planning Cost**	Total Project Cost
Bayfield			
Provide information kiosks (6)	$ 131,000	$ 25,000	$ 156,000
Little Sand Bay			
Construct visitor contact station (2,500 sq ft)	491,000	94,000	585,000
Remove existing contact station (2,000 sq ft)	12,000	2,000	14,000
Construct loop trail (0.5 mi)	13,000	2,000	15,000
Construct parking area (15-20 cars)	42,000	8,000	50,000
Improve Little Sand Bay Road (2 mi)	118,000	23,000	141,000
Sand Island			
Construct dock (12' wide, 50' long)	31,000	6,000	37,000
Restore exterior of light station	100,000	19,000	119,000
Construct new trail to light station (0.25 mi)	7,000	1,000	8,000
Construct campground (10 sites)	26,000	5,000	31,000
Construct camp shelters (3)	47,000	9,000	56,000
Relocate ranger residence (600 sq ft)	16,000	3,000	19,000
Raspberry Island			
Construct loop trail (1.5 mi)	39,000	8,000	47,000
Prepare historic structure report/light station furnishings study		30,000	30,000
Remove campsites (2)	3,000	1,000	4,000
Oak Island			
Construct campground (3-5 sites)	7,000	1,000	8,000
Extend trail to Schroeder logging camp (2 mi)	26,000	5,000	31,000
Manitou Island			
Construct campsites (2-5)	7,000	1,000	8,000
Construct loop trail (1 mi)	26,000	5,000	31,000
Construct employee quarters (1,000 sq ft)	81,000	15,000	96,000
Basswood Island			
Construct dock (12' wide, 50' long)	31,000	6,000	37,000
Construct trail (1.5 mi)	39,000	8,000	47,000
Construct campground (3-5 sites)	7,000	1,000	8,000
Construct campground shelters (3)	47,000	9,000	56,000
Construct loop trail (4 mi)	50,000	10,000	60,000
Stockton Island			
Construct footbridge (4' wide, 150' long)	31,000	6,000	37,000
Construct loop trail (7.5 mi)	197,000	38,000	235,000
Provide wayside exhibits (3)	12,000	3,000	15,000
Construct boardwalk (300'-500' long)	31,000	6,000	37,000
Outer Island			
Construct trail (1.25 mi)	7,000	1,000	8,000
Construct loop trail (4 mi)	50,000	10,000	60,000
Construct campsites (5-10)	9,000	2,000	11,000
Construct camp shelters (3)	47,000	9,000	56,000
Dredge harbor (16' wide x 300' long x 8' deep)	39,000	8,000	47,000
York Island			
Construct campsites (1-2)	3,000	1,000	4,000
Hermit Island			
Construct campsites (2-5)	7,000	1,000	8,000
Construct trail (1.5 mi)	39,000	8,000	47,000
Otter Island			
Construct campsites (5)	8,000	1,000	9,000
Devils Island			
Rehabilitate light station exterior; stabilize interior	131,000	25,000	156,000
Prepare historic grounds study (3 acres)		20,000	20,000

Alternative C (continued)	Gross Construction Cost*	Advance and Project Planning Cost**	Total Project Cost
Michigan Island			
Construct trail (1 mi)	26,000	5,000	31,000
Relocate campsites (4 sites)	4,000	1,000	5,000
Construct boardwalk (200'-300' long)	18,000	3,000	21,000
Prepare historic grounds study		30,000	30,000
Subtotal	**$2,056,000**	**$475,000**	**$2,531,000**
Public transportation costs (annual operating costs – concession ownership and operation)			905,000
Total	**$2,056,000**	**$4 ,000**	**$3,436,000**

Alternative D – Mainland Emphasis	Gross Construction Cost*	Advance and Project Planning Cost**	Total Project Cost
Bayfield			
Develop visitor center/park headquarters (9,600 sq ft)	$1,920,000	$ 364,000	$2,284,000
Construct parking area (30-50 cars)	56,000	11,000	67,000
Provide information kiosks (6)	131,000	25,000	156,000
Construct picnic area (20 sites)	21,000	4,000	25,000
Sand Point			
Construct parking area (10 cars)	13,000	3,000	16,000
Pave Sand Point Road (2.5 mi)***	1,375,000	261,000	1,636,000
Little Sand Bay			
Phase I			
Construct marina parking area (50 cars)	70,000	13,000	83,000
Remodel visitor contact station (2,000 sq ft)	131,000	25,000	156,000
Provide comfort station	104,000	20,000	124,000
Construct campground (50 sites)	50,000	10,000	60,000
Construct shoreline trail (10-12 mi)	314,000	60,000	374,000
Construct trail to Point Detour (0.75 mi)	20,000	4,000	24,000
Phase II			
Develop new harbor complex	4,573,000	873,000	5,446,000
Construct ranger station/visitor contact station	409,000	78,000	487,000
Construct parking area (50 cars)	47,000	9,000	56,000
Construct overnight parking area (10 cars)	20,000	4,000	24,000
Construct picnic area (30 sites)	39,000	8,000	47,000
Construct loop trail (0.5 mi)	13,000	2,000	15,000
Remove nonhistoric structures (6)	24,000	5,000	29,000
Remove existing visitor contact station (2,000 sq ft)	12,000	2,000	14,000
Construct road to harbor complex (1 mi)***	550,000	105,000	655,000
Construct road to Point Detour campground (1 mi)***	550,000	105,000	655,000
Develop and landscape site	26,000	5,000	31,000
Meyers Road			
Construct visitor information station (600 sq ft)	80,000	15,000	95,000
Construct parking area (30-50 cars)	70,000	13,000	83,000
Construct picnic area (20 sites)	28,000	5,000	33,000
Gravel Meyers Road (1.25 mi)	13,000	2,000	15,000
Sand Island			
Construct dock (12' wide, 50' long)	31,000	6,000	37,000
Construct trail to light station (0.5 mi)	13,000	2,000	15,000
Prepare historic structure report		30,000	30,000
Realign and harden existing trail (0.25 mi)	7,000	1,000	8,000
Rehabilitate East Bay dock (12' wide, 128' long)	39,000	8,000	47,000
Relocate ranger residence (600 sq ft)	16,000	3,000	19,000
Raspberry Island			
Construct loop trail (1.5 mi)	39,000	8,000	47,000
Prepare historic structure report/light station furnishings study		30,000	30,000
Oak Island			
Extend trail to Schroeder logging camp (2 mi)	26,000	5,000	31,000
Manitou Island			
Construct employee quarters (1,000 sq ft)	81,000	15,000	96,000
Basswood Island			
Construct dock (12' wide, 50' long)	31,000	6,000	37,000
Construct trail (2.0 mi)	39,000	8,000	47,000
Construct self-guided interpretive trail (0.5 mi)	13,000	2,000	15,000

***The National Park Service would have to gain authority to improve and maintain nonfederally owned roads.

Alternative D (continued)	Gross Construction Cost*	Advance and Project Planning Cost**	Total Project Cost
Stockton Island			
Construct footbridge (4' wide, 150' long)	31,000	6,000	37,000
Construct loop trail (7.5 mi)	197,000	38,000	235,000
Construct boardwalk (300'-500' long)	36,000	7,000	43,000
Hermit Island			
Construct trail (1.5 mi)	39,000	8,000	47,000
South Twin			
Construct loop trail (1.5 mi)	39,000	8,000	47,000
Remove employee quarters/interpretive station	3,000	1,000	4,000
Devils Island			
Rehabilitate light station exterior/stabilize interior	131,000	25,000	156,000
Prepare historic grounds study		30,000	30,000
Outer Island			
Rehabilitate light station exterior/stabilize interior	131,000	25,000	156,000
Construct trail (1.25 mi)	13,000	2,000	15,000
Michigan Island			
Rehabilitate light station exterior/stabilize interior	131,000	25,000	156,000
Remove campsites	3,000	1,000	4,000
Construct boardwalk (200'-300' long)	18,000	3,000	21,000
Prepare historic grounds study		30,000	30,000
Park operations			
Little Sand Bay			
Construct mainland housing (2 4-unit apartments & 3 residences)	773,000	148,000	921,000
Construct maintenance complex (total – 4,000 sq ft)	440,000	84,000	524,000
Bayfield			
Construct maintenance complex (1,500 sq ft)	197,000	38,000	235,000
Subtotal	**$13,176,000**	**$2,634,000**	**$15,810,000**
Public transportation costs (annual operating costs – concession ownership and operation)			409,000
Total	**$13,176,000**	**$2,634,000**	**$16,219,000**

Alternative E – Parkwide Emphasis	Gross Construction Cost*	Advance and Project Planning Cost**	Total Project Cost
Bayfield			
Provide information kiosks (6)	$ 131,000	$ 25,000	$ 156,000
Sand Point			
Construct parking area (10 cars)	13,000	3,000	16,000
Pave Sand Point Road (2.5 mi)***	1,375,000	261,000	1,636,000
Little Sand Bay			
Phase I			
Construct marina parking area (50 cars)	70,000	13,000	83,000
Remodel visitor contact station; provide comfort station	104,000	20,000	124,000
Construct campground (50 sites)	130,000	25,000	155,000
Construct shoreline trail (10-12 mi)	314,000	60,000	374,000
Construct loop trail (0.5 mi)	13,000	2,000	15,000
Phase II			
Develop new harbor complex	4,573,000	873,000	5,446,000
Construct interpretive center/ranger station	1,200,000	228,000	1,428,000
Construct parking area (30-40 cars)	56,000	11,000	67,000
Construct overnight parking area overnight (10 cars)	20,000	4,000	24,000
Construct road to harbor complex (1 mi)***	550,000	105,000	655,000
Construct road to Point Detour campground (1 mi)***	550,000	105,000	655,000
Remove old visitor contact station (2,000 sq ft)	12,000	2,000	14,000
Remove nonhistoric structures (6)	24,000	5,000	29,000
Landscape site	26,000	5,000	31,000
Meyers Road			
Construct visitor information station (800 sq ft)	158,000	30,000	188,000
Construct parking area (30-50 cars)	70,000	13,000	83,000
Construct picnic area (20 sites)	20,000	4,000	24,000
Gravel Meyers Road (1.25 mi)	13,000	2,000	15,000
Sand Island			
Restore light station	131,000	25,000	156,000
Prepare historic structure report		30,000	30,000
Realign and harden existing trail (0.25 mi)	7,000	1,000	8,000
Construct campground (10 sites)	26,000	5,000	31,000
Construct camp shelters (3)	47,000	9,000	56,000
Relocate ranger residence (600 sq ft)	16,000	3,000	19,000
Raspberry Island			
Construct loop trail (1.5 mi)	39,000	8,000	47,000
Prepare historic structure report/light station furnishings study		30,000	30,000
Oak Island			
Construct campground (3 5 sites)	7,000	1,000	8,000
Extend trail to Schroeder logging camp (2 mi)	26,000	5,000	31,000
Manitou Island			
Construct campsites (2-5)	7,000	1,000	8,000
Construct loop trail (1 mi)	26,000	5,000	31,000
Basswood			
Construct dock (12' wide, 50' long)	31,000	6,000	37,000
Construct trail (2.0 mi)	39,000	8,000	47,000
Construct campground (3-5 sites)	7,000	1,000	8,000
Construct camp shelters (3)	47,000	9,000	56,000
Construct loop trail (4 mi)	50,000	10,000	60,000
Stockton Island			
Construct footbridge (4' wide, 150' long)	31,000	6,000	37,000
Construct loop trail (7.5 mi)	197,000	38,000	235,000
Provide wayside exhibits (3)	12,000	3,000	15,000
Construct boardwalk (300-500' long)	36,000	7,000	43,000
York Island			
Construct campsites (1-2 sites)	2,000	1,000	3,000

	Gross Construction Cost*	Advance and Project Planning Cost**	Total Project Cost
Alternative E (continued)			
Hermit Island			
Construct campsites (3-5 sites)	7,000	1,000	8,000
Construct trail (1.5 mi)	39,000	8,000	47,000
South Twin Island			
Remove employee quarters	2,000	1,000	3,000
Otter Island			
Construct campsites (5 sites)	7,000	1,000	8,000
Rocky Island			
Improve campsites (7 sites)	2,000	1,000	3,000
Relocate/construct employee quarters (1,000 sq ft)	81,000	15,000	96,000
Devils Island			
Rehabilitate light station exterior; stabilize interior	131,000	25,000	156,000
Prepare historic grounds study		30,000	30,000
Outer Island			
Rehabilitate light station exterior; stabilize interior	131,000	25,000	156,000
Construct trail (1.25 mi)	13,000	2,000	15,000
Michigan Island			
Relocate campsites (4 sites)	4,000	1,000	5,000
Construct boardwalk (200-300' long)	18,000	3,000	21,000
Park Operations			
Little Sand Bay			
Relocate mainland housing (3 residences & 2 4-unit apartments)	773,000	148,000	921,000
Subtotal	**$11,414,000**	**$2,269,000**	**$13,683,000**
Public transportation costs (annual operating costs – concession ownership and operation)			646,000
Total	**$11,414,000**	**$2,269,000**	**$14,329,000**

Table D-2: Staffing

Alternative	Administration		Interpretation		Resource Management and Visitor Protection		Maintenance		Total	
	FTEs	Cost	FTEs	Cost	FTEs	Cost	FTEs	Cost	FTEs	Cost
A	8.5	207,000	4.8	100,000	9.9	248,000	21	504,000	44.2	1,059,000
B	8.5	207,000	4.3	91,000	11.8	279,000	21	504,000	45.6	1,081,000
C	8.5	207,000	5.9	129,000	12.3	289,000	21	504,000	47.7	1,129,000
D	8.5	207,000	8.5	180,000	12.4	290,000	24.3	549,000	53.7	1,226,000
E	8.5	207,000	9.1	191,000	12.5	291,000	24.3	549,000	54.4	1,238,000

APPENDIX E: RESERVATIONS FOR USE AND OCCUPANCY OR LIFE ESTATES

Tract Number	Name	Period	Approximate Acreage	Location
01-116	Jensch, B., *et al.*	(10)1-08-95	5.10	Little Sand Bay
04-108	Denker, R. (vice W. McNeill)	(25)5-9-99	1.91	Squaw Bay
04-109	Denker, R., *et ux.*	(25)5-30-99	3.38	Squaw Bay
04-112	Carlson, H., *et ux.*	(25)3-14-99	6.29	Squaw Bay
04-115	Scharf, O., *et ux.*	(15)9-4-88	1.39	Squaw Bay
04-116	Caldwell, W., *et ux.*	(25)7-9-98	2.71	Squaw Bay
06-102	Westhagen, E.	(25)4-21-06	5.70	Sand Island
06-104	Biorn, G.	(25)12-17-00	0.80	Sand Island
06-109	Budvic (Peters, H.)	Life	2.00	Sand Island
06-117	Jensch, *et al.*	(25)4-19-06		Sand Island
06-120	Jensch, *et al.*	Life		Sand Island
06-130	Palm, R., *et al.*	(25)1-6-00	0.97	Sand Island
06-143	Rice, M., *et al.*	Life	49.69	Sand Island
09-101	Stump/Stalker, Inc.	(25)11-16-98	3.38	Bear Island
09-104	Masota, A., *et ux.*	Life	10.50	Bear Island
12-125	Echman, *et ux.* (vice Larson)	(24)11-12-98	3.38	Hermit Island
15-101	Sanders, E., *et al.*	(25)1-3-02	0.91	Otter Island
16-103	Hadland, E., *et al.*	(25)3-12-99	1.16	Rocky Island
16-104	Benson, F., *et al.*	(25)4-7-06	Unknown	Rocky Island
16-105	Jones, R., *et al.*	(25)3-21-99	5.30	Rocky Island
16-106	Chapin, J., *et al.*	Life	4.30	Rocky Island
16-107	Nelson, R., *et al.*	Life	7.26	Rocky Island
16-108	Erickson, M., *et al.*	Life	4.50	Rocky Island
16-109	Nourse, L., *et ux.*	(25)4-29-99	0.52	Rocky Island
16-113	Lindgren, H., *et al.*	(25)5-31-99	3.16	Rocky Island
24-104	Sivertson, *et al.*	(1)8-31-89	20.00	Long Island

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APPENDIX F: OPTIONS FOR ACCESS ROAD IMPROVEMENTS

As indicated in the text, most of Little Sand Bay Road requires improvements to its base and traveling surface. Financing such improvements could cause an undue burden on the town. Subject to any legal authorization that may be required, there are several options for financing road improvements of Little Sand Bay Road, plus other mainland access roads, as follows:

1. *Convert Little Sand Bay Road from town to county jurisdiction* – This would possibly increase potential funding for improvements because of a broader tax base. This change was recommended in "A Jurisdictional Highway System Plan for Bayfield County," prepared by the Bayfield County Jurisdictional Highway Committee in 1978. If the roadway was also designated as part of the Federal Aid Highway System (federal aid secondary), roadway improvements would be eligible for federal funding out of the Highway Trust Fund. The plan also recommended that over the long term Little Sand Bay Road come under jurisdiction of the National Park Service.

2. *Obtain a 99-year lease for the right-of-way from Russell Township* – This would provide the federal government with administrative control of the road; consequently, improvements would be eligible for Federal Lands Highway Program funds. The Park Service would maintain the roadway and probably provide contractual assurance that it would not close town roads that crossed federal land (as agreed upon by all parties). This lease could cover all town roads that provide access to lakeshore mainland facilities (as also agreed by all parties). A boundary adjustment could be required for this type of lease arrangement. Under a lease arrangement the town would continue to receive any fuel tax funds because the town would retain right-of-way ownership. Federal highway funds could be used if the federal government owned or had obtained administrative control through a lease of the right-of-way.

3. *Undertake a boundary change to obtain federal ownership of the right-of-way of Little Sand Bay Road* – The potential for direct federal funding of road improvements would increase with federal ownership of the road right-of-way. Federal highway funds could be used for roadway improvements.

4. *Obtain road improvement funding from the line-item construction program of the Park Service* – Since the implementation of the Federal Lands Highway Program, the prospects of funding from the construction program are quite low.

APPENDIX G: THREATENED OR ENDANGERED PLANT AND ANIMAL SPECIES

The following plants and animals are known to inhabit Apostle Islands National Lakeshore and are currently on the *Wisconsin State Threatened and Endangered Species List* (1985).

Common Name	Scientific Name	Status
Plants		
Moonwort	*Botrychium lunaria*	Endangered
Beautiful sedge	*Carex concinna*	Threatened
Lenticular sedge	*Carex lenticularis*	Threatened
Michaux's sedge	*Carex Michauxiana*	Threatened
English sundew	*Drosera anglica*	Threatened
Linear-leafed sundew	*Drosera linearis*	Threatened
Broad-leafed twayblade	*Listera convallarioides*	Threatened
Small round-leafed orchid	*Orchis rotundifolia*	Threatened
Marsh grass-of-Parnassus	*Parnassia palustris*	Threatened
Butterwort	*Pinguicula vulgaris*	Endangered
Small shinleaf	*Pyrola minor*	Endangered
Dune goldenrod	*Solidago spathulata*	Threatened
Spike trisetum	*Trisetum spicatum*	Threatened
Animals		
Cooper's hawk	*Accipiter cooperii*	Threatened
Red-shouldered hawk	*Buteo lineatus*	Threatened
Piping plover*	*Charadrius melodus*	Endangered
Peregrine falcon	*Falco peregrinus*	Endangered
Bald eagle*	*Haliaeetus leucocephalus*	Endangered
Osprey	*Pandion haliaetus*	Endangered
Forster's tern	*Sterna forsteri*	Endangered
Common tern	*Sterna hirundo*	Endangered
Tremblay's salamander	*Ambystoma tremblayi*	Threatened

*Federally listed endangered species.

APPENDIX H: RECOMMENDED STUDIES

Littoral Drift Study – The Otter Island dock may be affecting the littoral drift and sandspit formation. A study is needed to determine if there is an effect and, if so, to recommend appropriate action.

Interpretive Prospectus – The last interpretive prospectus for the lakeshore was written in 1979. This plan needs to be updated to implement the proposals of the new general management plan. The prospectus needs (1) to develop a diversity of new summer, off-season, and special programs, (2) to design a new interpretive center, and (3) to determine the location, number, and type of wayside exhibits. In addition, interpretive staffing requirements would be set, and new information/orientation maps and guides would be produced.

Sociological Studies – Previous studies have provided information on sailboat users and cruise boat users. A new study is needed to determine the characteristics of the other lakeshore users and their recreational experiences. A study is also needed to determine environmental impacts of recreational use within the lakeshore, the socioeconomic impacts on the region of recreational use of the lakeshore, and the management system needed to protect recreational resources.

Historic Resource Study – A comprehensive historic resource study is needed for the entire lakeshore to evaluate archeological and historic resources. This study would provide the overall context for these resources and evaluate all park resources to determine if they meet National Register criteria. Those that meet the criteria will be nominated to the register, and a base map depicting cultural resources will be developed. The resource study should be done in coordination with the underwater resource study.

Historic Structure Reports – Historic structure reports are needed for the light stations on Raspberry, Sand, Outer, Michigan, Long, and Devils islands. Such a report is prepared when there is to be a major change of use for a historic structure or where activities are programmed that would affect the qualities and characteristics that make the property eligible for inclusion on the National Register. The report consists of the collection, presentation, and evaluation of historical and architectural/engineering research findings on the structure, including all periods of construction (not just "significant" periods), modifications, source material, building techniques, other evidence of use, and setting. Recommendations for treatment are made that are consistent with the structure's setting and its significance, integrity, condition, and programmed use.

Historic Furnishings Study – A historic furnishings study is needed for the Raspberry Island light station to document its historic furnishings. The study determines what furnishings to display and how to arrange them. It also controls their maintenance, replacement, or other changes in the furnishings to protect the quality and integrity of the historic structure.

Cultural Landscape Report – Cultural landscape reports are needed for the Devils Island and Michigan Island light stations. A landscape report documents the historical development of a microenvironment in association with related structures and the significance to the lakeshore. This information provides the context for understanding, restoring, and interpreting a particular environment.

Underwater Resource Study – A phased underwater resource study is needed to discover and record the conditions of shipwrecks found within the 0.25-mile boundary around each island.

Special History Study – A special history study on the role and function of the Apostle Islands light stations in Great Lakes navigation would enable the lakeshore to better interpret the story to visitors.

Environmental Monitoring Survey – This information is vital to establishing carrying capacities for the lakeshore. Study areas in the lakeshore would be identified, evaluated, and monitored for the impacts resulting from recreational use.

APPENDIX I: FACILITY CAPACITY METHODOLOGY

The annual facility capacity at Apostle Islands National Lakeshore is estimated to be approximately 507,000 visits based on existing conditions. The adoption of one of the alternatives could cause the facility capacity to increase by a range of 16,000 to 360,000 visits per year. The following table summarizes facility capacities for both the mainland and island zones for each of the alternatives. The total parkwide capacity is also presented.

Table I-1. Annual Facility Capacity, Apostle Islands National Lakeshore Comparison of Alternatives

	Recreation Visits		
	Island	Mainland	Total
Alternative A – Existing Conditions	239,000	268,000	507,000
Alternative B – Primitive Emphasis	230,000	293,000	523,000
Alternative C – Island Emphasis	255,000	293,000	548,000
Alternative D – Mainland Emphasis	236,000	631,000	867,000
Alternative E – Parkwide Emphasis	249,000	466,000	715,000

PROCEDURE

Annual facility capacities for each alternative were determined by adapting the methodology used in the publication *Design Day for Recreation Planning* (Hatke, Knudson, and Ziegler 1977). This methodology, which is centered on the "design day," was developed by Purdue University for the Indiana Department of Natural Resources. Annual facility capacity was calculated in the following manner:

1) *Daily facility capacity* – one-time facility capacity × turnover rate

2) *Annual facility capacity for each unit (islands and mainland)* – daily facility capacity × number of design days

3) *Annual facility capacity for the park* – the sum of the annual capacities for each unit of the park (islands and mainland)

DEFINITION OF TERMS

One-time (or "instant") facility capacity – The maximum number of people a facility can support at a particular instant.

Turnover rate – The average length of an activity day divided by the average length of stay.

Daily facility capacity – The one-time facility capacity for each unit × estimated turnover rate.

Design day – By examining visitation statistics, the number of days during the season that facilities experience peak daily use is determined. One of these peak use days is a design day. The number of normal use days that equals one design day is then calculated for the use season (which is adjusted to allow for a certain percentage of days with bad weather), and the number of design days is totaled.

ASSUMPTIONS

Any estimate or projection is based on a set of assumptions, and holds true only so long as these assumptions are viable. The following section describes the assumptions that were used in determining facility capacities for Apostle Islands.

Multipliers

In order to convert parking spaces and boat slips into an equivalent number of visitors, a people per unit multiplier was applied. The multipliers used in this conversion for the capacity estimates were 3.3 people per car and 4.0 people per boat. These multipliers correspond to those which Apostle Islands uses in its monthly use reports.

Turnover Rates

The turnover rates that were applied to capacity calculations were also derived from the lakeshore's monthly use reports. For example, the average length of stay at the Bayfield headquarters visitor center is about 15 minutes. The visitor center operates on a 10-hour day during the summer peak-use period. Thus, 10 hours divided by 15 minutes denotes a turnover rate of 40. This rate was used in calculating the facility capacity for headquarters/visitor center use under each alternative.

The average length of stay at Little Sand Bay is currently two hours. Assuming a 12 hour use-day, the turnover rate for the visitor contact station is 6. This standard was used for estimating facility capacities of all existing and proposed parking lots at Little Sand Bay, Meyers Road, and Sand Point. The exception to this norm was the proposed 10-space overnight lot at Little Sand Bay (alternatives D and E), which was estimated to have a turnover rate of 1.

The turnover rate for the proposed campground at Little Sand Bay was estimated to be 1. The same rate was used for all private and charter boating, and for water taxi usage. The turnover rate for tour boat service was estimated at 1 × the total number of trips made by the boats on a peak-use day for each alternative.

Volume of Boat Use

Private and Chartered Boats. The total number of private and chartered boats that can be in the Apostle Islands group at one time was assumed to equal

1) the total number of available slips at marinas in the vicinity of the lakeshore; plus

2) the average number of boats that enter the system from other Lake Superior ports; plus

3) the average number of boats that are launched at local ramps

A study of social carrying capacity among boaters in the Apostle Islands found that approximately 85 percent of the total boat usage can be attributed to craft from local marinas (Heberlein, et al. 1986). The same study determined the total number of available slips at local marinas to be 708. If all slips were rented, a like number of boats could be on the lake at any given time.

If 85 percent of boat usage is attributable to locally harbored vessels, it is assumed that 15 percent of total boat usage can be ascribed to boats from other ports and boats that are launched near the lakeshore. Based on this assumption, 125 boats were added to the above figure. Thus, a total of 833 private and chartered boats could be in the island system at one time.

Water Taxi Use. Park staff have estimated that about 1 percent of total lakeshore use can be attributed to users of water taxis. Through interpolation, this percentage was found to be equivalent to an additional five private vessels in the system at a given time.

Total Private/Charter Boat Use. Assuming four passengers per boat, the total facility capacity for the island zone was determined to be about 211,000 [or ((833 ± 5) × 4) × 63 design days].

POTENTIAL INCREASES IN LOCAL MARINA SPACE

It should be noted that none of the alternatives in this general management plan proposes an increase in the available slips at local marinas. Any increase in marina space would depend on the initiatives of the private sector.

An increase in the number of slips, however, would affect the facility capacity of the islands. For example, an increase of 100 slips in the area would result in an additional 25,000 people per year in facility capacity.

SELECTED BIBLIOGRAPHY

ANDERSON, R. K., C. J. MILFRED, G. J. KRAFT, AND W. J. FRAUNDORF
1980 "Inventory of Selected Stockton Island Resources for Recreation Planning." University of Wisconsin at Stevens Point.

BRANDER, ROBERT B.
1980 "A Conceptual Plan for Development of a System of Campsites and Trails on the Inner Apostle Islands." Report prepared for the National Park Service. On file at Apostle Islands National Lakeshore.

CARY, S. J., P. F. MCDOWELL, AND L. J. GRAUMLICH
1978 "Soils and Sunicial Geology of Four Apostle Islands." Paper presented at the annual meeting of the Wisconsin Academy of Sciences, Arts and Letters.

ENGSTROM, WAYNE N.
1984 "Evaluation of Shoreline Changes along Cuspate Forelands at Apostle Islands National Lakeshore." California State University, Fullerton.

FOREST SERVICE, U.S. DEPARTMENT OF AGRICULTURE
1986 "The Limits of Acceptable Change (LAC) System for Wilderness Planning," by George Stanley, David Cole, Bob Lucus, Margaret Peterson, and Sid Frissell. Research paper INT-176. Intermountain Forest and Range Experiment Station, Ogden, UT.

GREAT LAKES INTER-TRIBAL COUNCIL AND RED CLIFF OVERALL ECONOMIC DEVELOPMENT COMMITTEE
1976 *Red Cliff Overall Economic Development Plan.* Red Cliff: Red Cliff Reservation.

HARRIS, JAMES T., AND SUMNER W. MATTESON
1975 "Gulls and Terns as Indicators of Man's Impact upon Lake Superior." University of Wisconsin Sea Grant, Madison, Wisconsin.

HATKE, TRUDY E., DOUGLAS M. KNUDSON, AND JEFFREY ZIEGLER
1977 "Design Day for Recreation Planning: Element Number 5 of the 1975-79 Indiana Outdoor Recreation Planning Program." Report prepared by Purdue University, Department of Forestry and Natural Resources, for the Division of Outdoor Recreation, Indiana Department of Natural Resources, Indianapolis.

HEBERLEIN, THOMAS A., GERALDINE E. ALFANO, AND LAURIE H. ERVIN
1985 "Using a Social Carrying Capacity Model to Estimate the Effects of Marina Development at the Apostle Islands National Lakeshore." Madison, WI.

HEBERLEIN, THOMAS A., TRUDY A. MCKINNELL, AND LAURIE H. ERVIN
1986 "Recreational Boating in the Apostle Islands National Lakeshore: Current Boaters and Trends of the Last Decade." Madison, WI.

HEBERLEIN, THOMAS A., AND JERRY J. VASKE
1975 "The Apostle Islands Visitor in 1975." Working paper no. 11. School of Natural Resources, College of Agricultural and Life Sciences, University of Wisconsin, Madison.

INTERNATIONAL JOINT COMMISSION
1976 *The Waters of Lake Huron and Lake Superior.* Vol. 3 (parts A & B): *Lake Superior.* Report to the IJC by the Upper Lakes Reference Group. Windsor, ONT.

KRAFT, GEORGE J.
1982 "Soil and Recreational Use on the Apostle Islands National Lakeshore: 1. Soil Suitability for Trails and Campsites; 2. Bank Erosion in the Presque Isle Campground." MS Thesis. College of Natural Resources, University of Wisconsin at Stevens Point.

MARTIN, L.
1965 *The Physical Geography of Wisconsin.* 3rd ed. Madison: University of Wisconsin Press.

MATHESON, D. H., AND M. MUNAWAR
1978 "Lake Superior Basin and Its Development." *Journal of Great Lakes Research* 4(3-4):249-63.

NATIONAL PARK SERVICE, U.S. DEPARTMENT OF THE INTERIOR
1978 *Environmental Assessment, Proposed Mainland Development, Apostle Islands National Lakeshore.* Denver Service Center.

1979 *Interpretive Prospectus, Apostle Islands National Lakeshore.* Midwest Regional Office. Omaha, NE.

1985 *Environmental Assessment: Natural Resources Inventory and Management, Apostle Islands National Lakeshore.* Bayfield, WI.

1985 *Statement for Management, Apostle Islands National Lakeshore.* Bayfield, WI.

1987 *Resources Management Plan and Environmental Assessment, Apostle Islands National Lakeshore.* Bayfield, WI.

1988 *Statement for Interpretation, Apostle Islands National Lakeshore.* Bayfield, WI.

n. d. *Land Protection Plan, Apostle Islands National Lakeshore.* Bayfield, WI.

NORTHWEST WISCONSIN REGIONAL PLANNING COMMISSION
1981 *A Plan for Outdoor Recreation.* Bayfield, WI.

SAARNISTO, M.
1975 "Stratigraphical Studies on the Shoreline Displacement of Lake Superior." *Canadian Journal of Earth Sciences* 12:300-319.

SHELBY, BO, AND THOMAS A. HEBERLEIN
1986 *Carrying Capacity in Recreation Settings.* Corvallis: Oregon State University Press.

SOIL CONSERVATION SERVICE, U.S. DEPARTMENT OF AGRICULTURE
1961 "Soil Survey of Bayfield County, Wisconsin," by J. K. Ableiter and F.D. Hole. Series 1939, no. 30.

STADNYK, LELYN, RICHARD L. VERCH, AND BRUCE A. GORTZ
1974 "Stockton Island Survey." Northland College, Ashland, WI.

STRZOK, DAVE
1981 *A Visitor's Guide to the Apostle Islands National Lakeshore.* Superior Printing.

SUBCOMMITTEE OF THE NORTH CENTRAL FIELD COMMITTEE
1964 "Proposed Apostle Islands National Lakeshore, Bayfield-Ashland Counties, Wisconsin."

TEMPLE, STANLEY A., AND JAMES T. HARRIS
1985 *Birds of the Apostle Islands.* Hartland, WI: The Wisconsin Society for Ornithology, Inc.

U.S. FISH AND WILDLIFE SERVICE, U.S. DEPARTMENT OF THE INTERIOR
1983 *Northern States Bald Eagle Recovery Plan.* Twin Cities, MN.

1988 *Great Lakes and Northern Great Plains Piping Plover Recovery Plan.* Twin Cities, MN.

WISCONSIN COASTAL MANAGEMENT COUNCIL
1987 *Wisconsin Coastal Management Program for the Great Lakes, 1987 Update.*

WISCONSIN DEPARTMENT OF NATURAL RESOURCES, SCIENTIFIC AREAS PRESERVATION COUNCIL
n.d. "Outer Island Sandspit Plant Species," by William E. Tans. Madison, WI.

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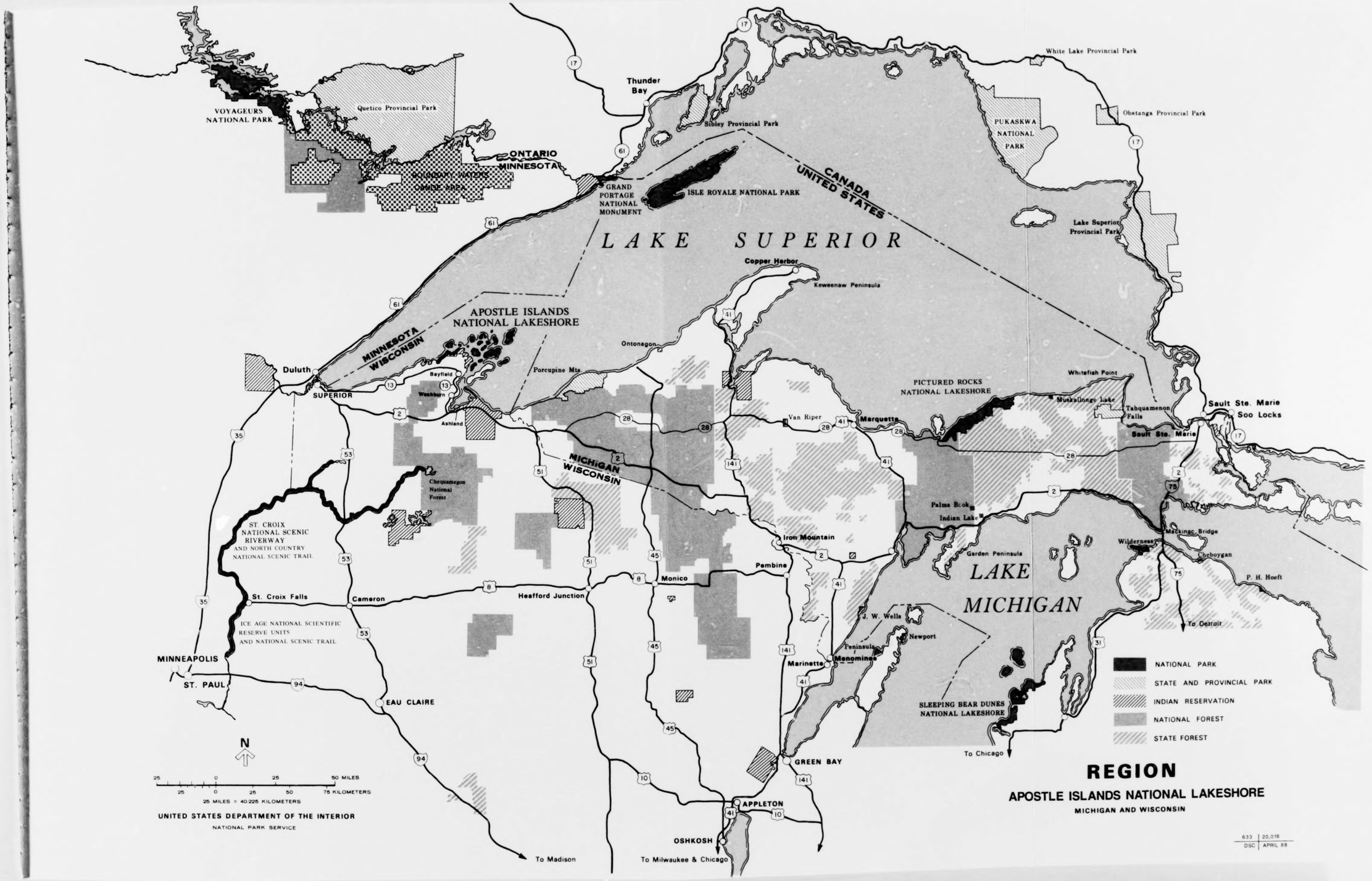
NPS D- 124 June 1989



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APOSTLE ISLANDS NATIONAL LAKESHORE

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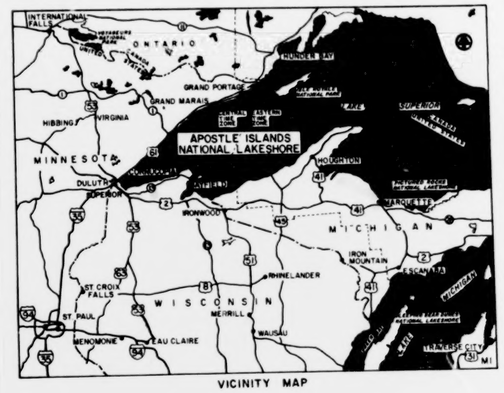

VICINITY MAP

MANAGEMENT ZONES

NATURAL ZONE

No ..... Outstanding Natural Feature Subzone*
Np ..... Protected Natural Subzone* (Eagle, Gull and N. Twin Islands)
(Mainland from Little Sand Bay to Squaw Bay is included in Natural Zone)

DEVELOPMENT ZONE

HISTORIC ZONE
See Outstanding Historic Features Map for additional information.

SPECIAL USE ZONE

Sg ..... Other Local Government
Sr ..... Reservation of use and occupancy
(All Lake Superior waters within the Lakeshore boundaries are also included in the Special Use Zone)

*See Outstanding Natural Features Map (Sheet 2) for additional information.

LEGEND

- NPS BOUNDARY
- CAMPGROUND
- IMPROVED TRAILS (DOES NOT INCLUDE UNIMPROVED TRAILS AND ROUTES OR 1981 TRAIL CONSTRUCTION).
- DOCKS
- LIGHTHOUSE

BASIC DATA: DWG. # 633/80005 DATED 4/30/76, DWG. II 633/30000-A DATED 1/21/76 (BASIC DATA 633/80005B)

5/8" = 1 MILE SCALE

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	DATE	INITIAL
ELJ DESIGNED	5/5/81	ELJ
ELJ DRAWN	1/11/82	
CHECKED	9/19/84	ELJ
5/5/81 DATE	6/87	ELJ

RECOMMENDED _____ SUPERINTENDENT _____ DATE
CONCURRED: ASSOCIATE REGIONAL DIRECTOR _____ DATE
APPROVED _____ REGIONAL DIRECTOR _____ DATE

UNITED STATES
DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
PLANNING AND RESOURCE PRESERVATION
MIDWEST REGIONAL OFFICE

EXISTING MANAGEMENT ZONING and BOUNDARY

APOSTLE ISLANDS NATIONAL LAKESHORE
BAYFIELD AND ASHLAND COUNTIES, WISCONSIN

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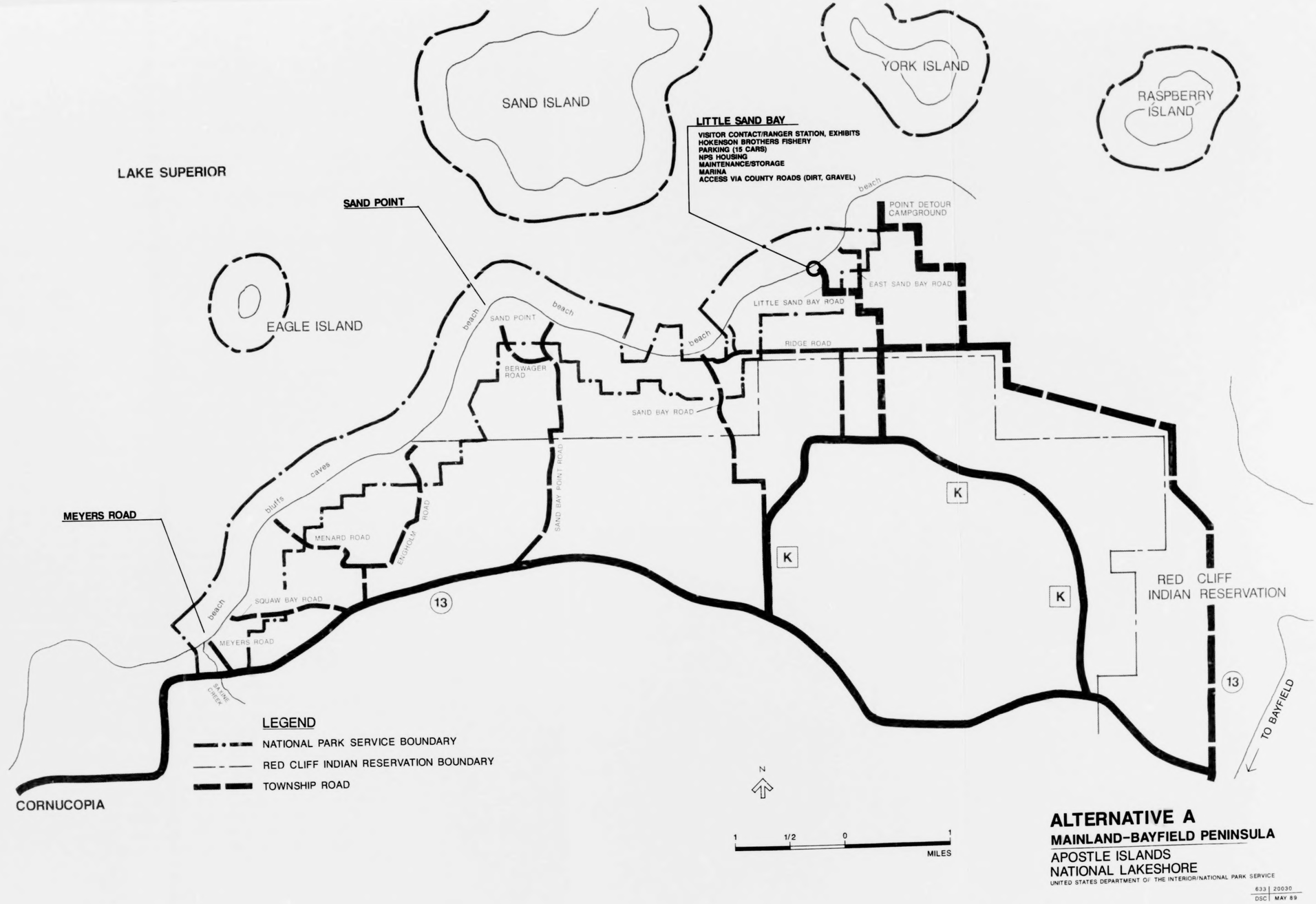

ALTERNATIVE A
MAINLAND-BAYFIELD PENINSULA

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UNITED STATES DEPARTMENT OF THE INTERIOR/NATIONAL PARK SERVICE

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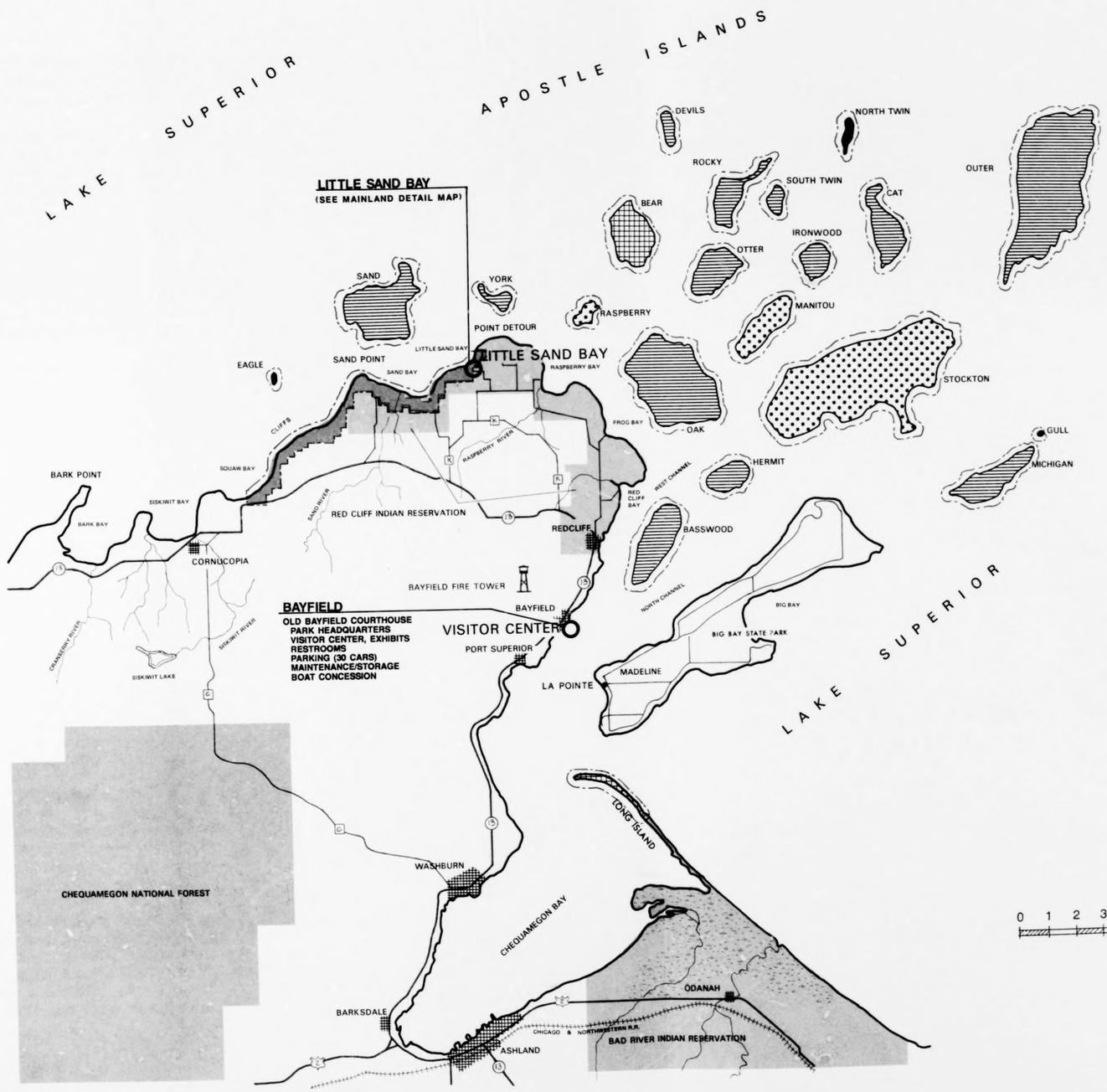

ALTERNATIVE A

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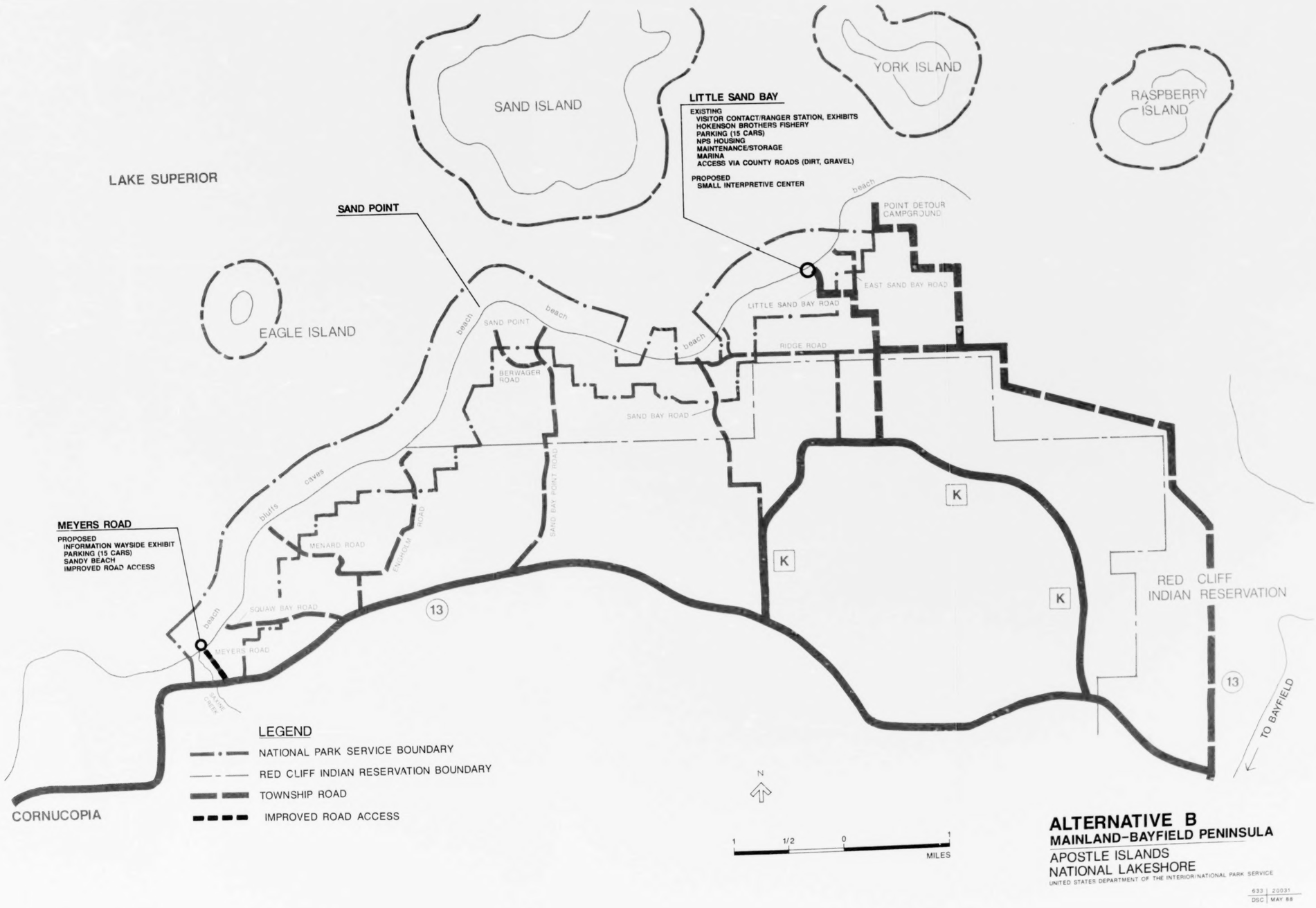

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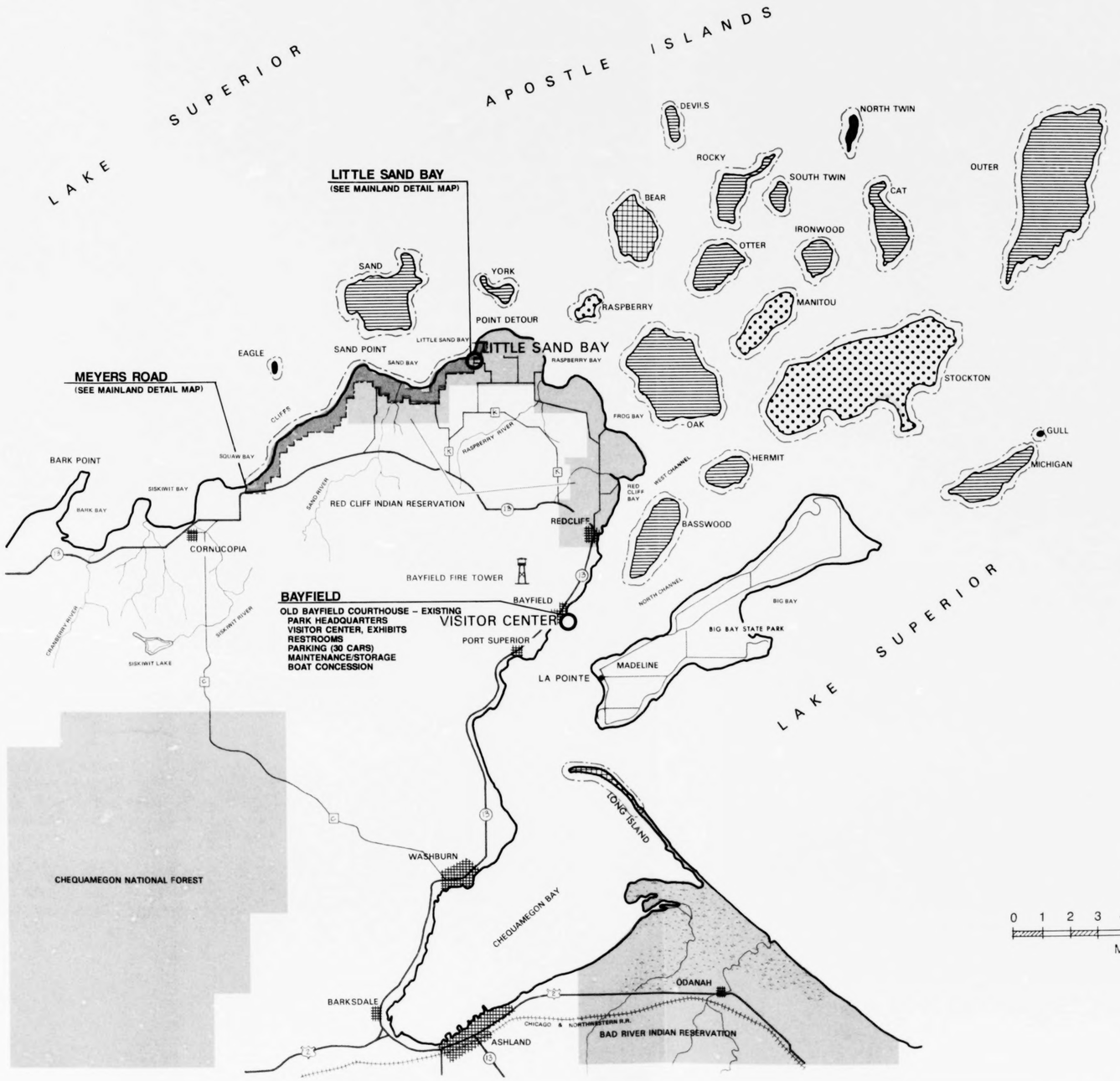

VISITOR USE AND ACCESS

- STRUCTURED
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- FUTURE
- RESTRICTED
- NPS BOUNDARY

ALTERNATIVE B

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UNITED STATES DEPARTMENT OF THE INTERIOR / NATIONAL PARK SERVICE

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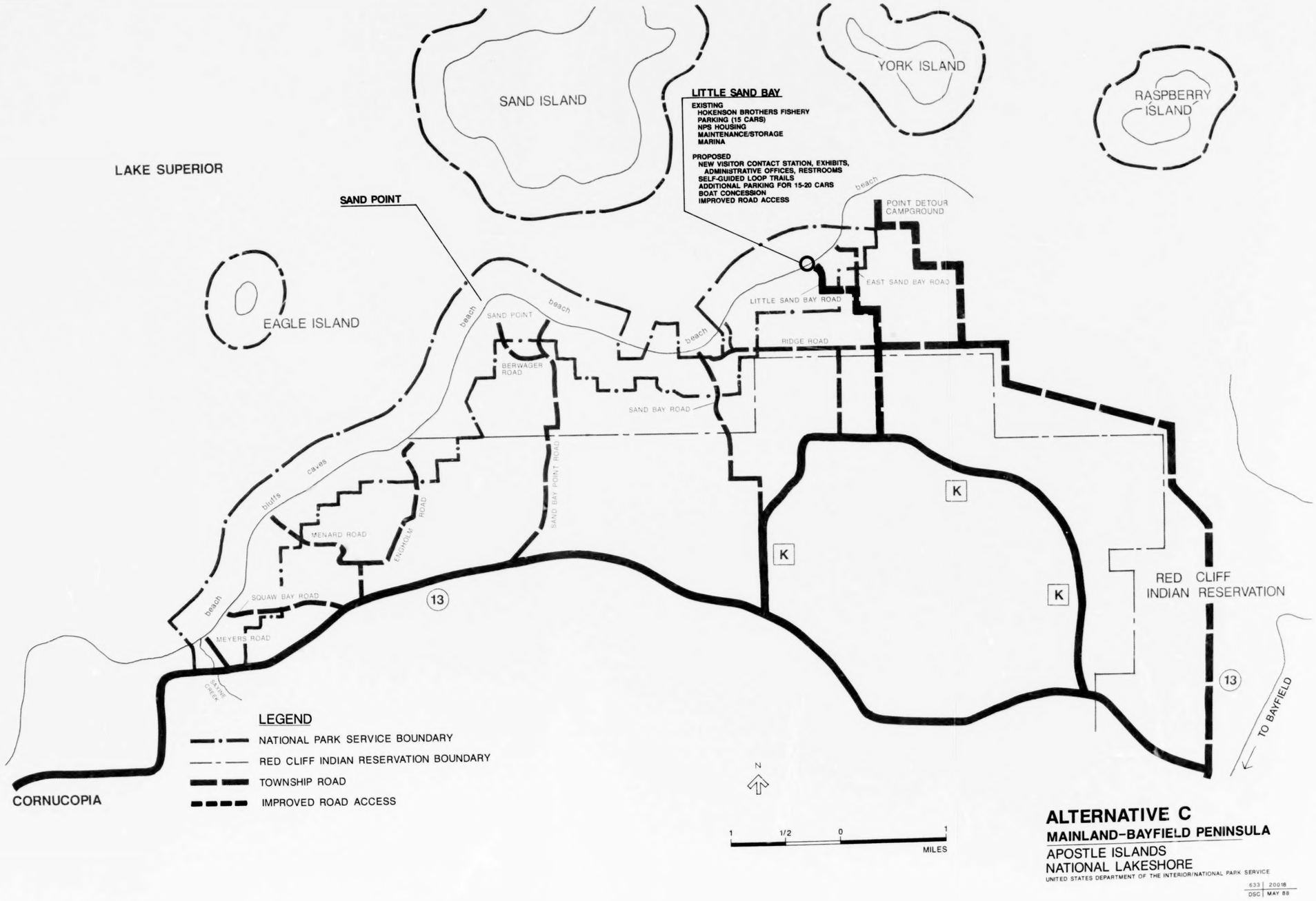

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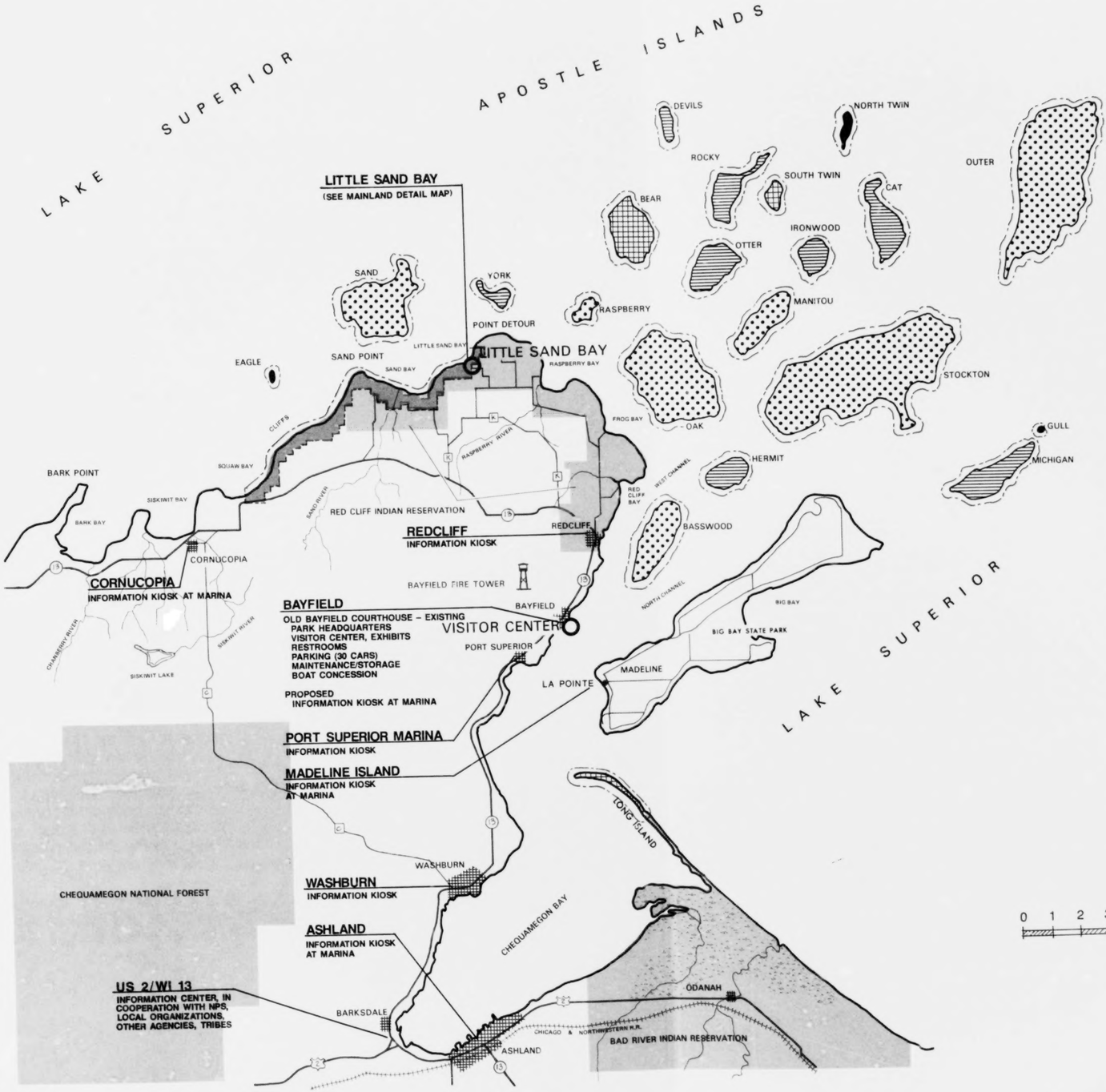

VISITOR USE AND ACCESS

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- NPS BOUNDARY

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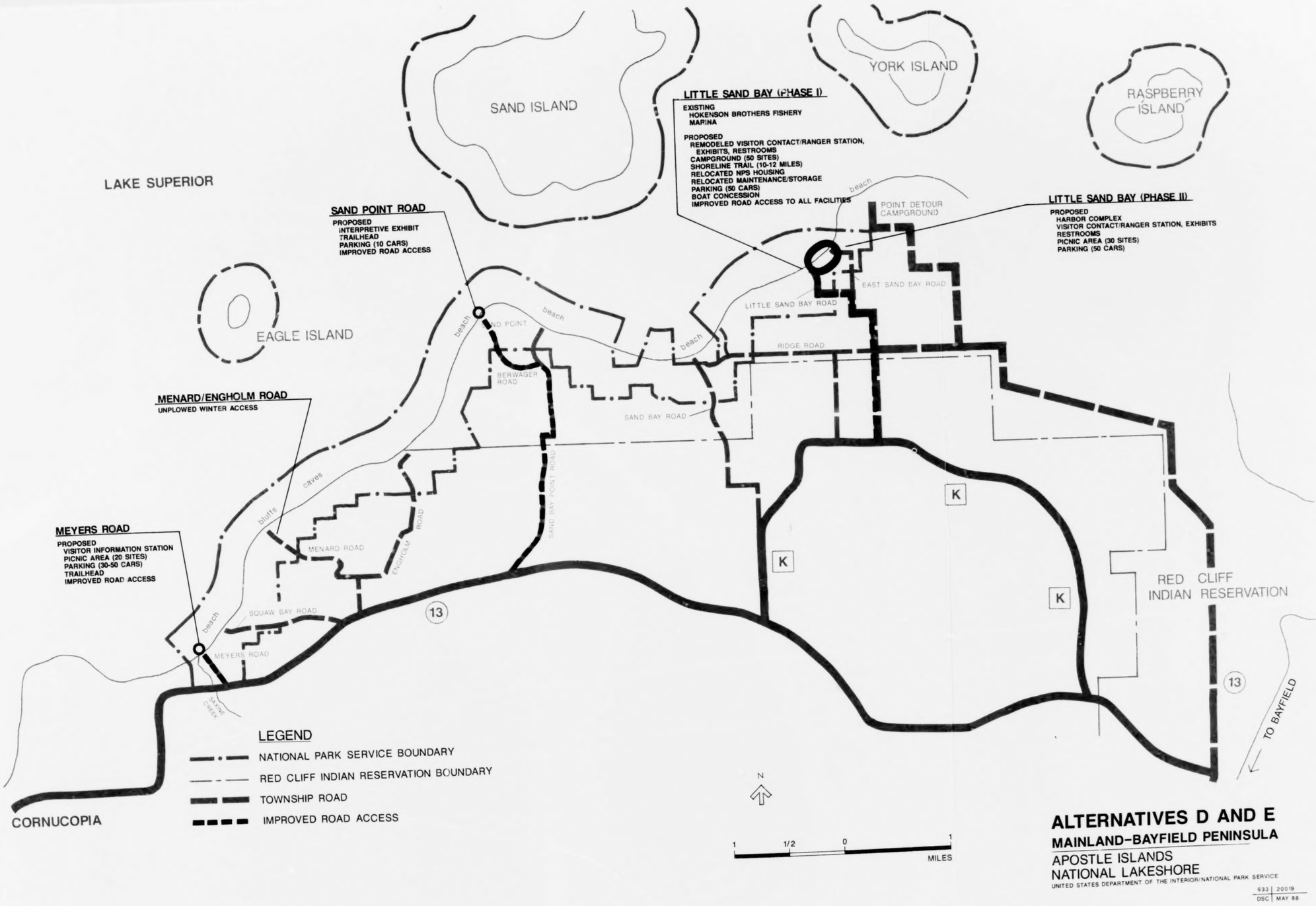

ALTERNATIVES D AND E

MAINLAND–BAYFIELD PENINSULA

APOSTLE ISLANDS
NATIONAL LAKESHORE

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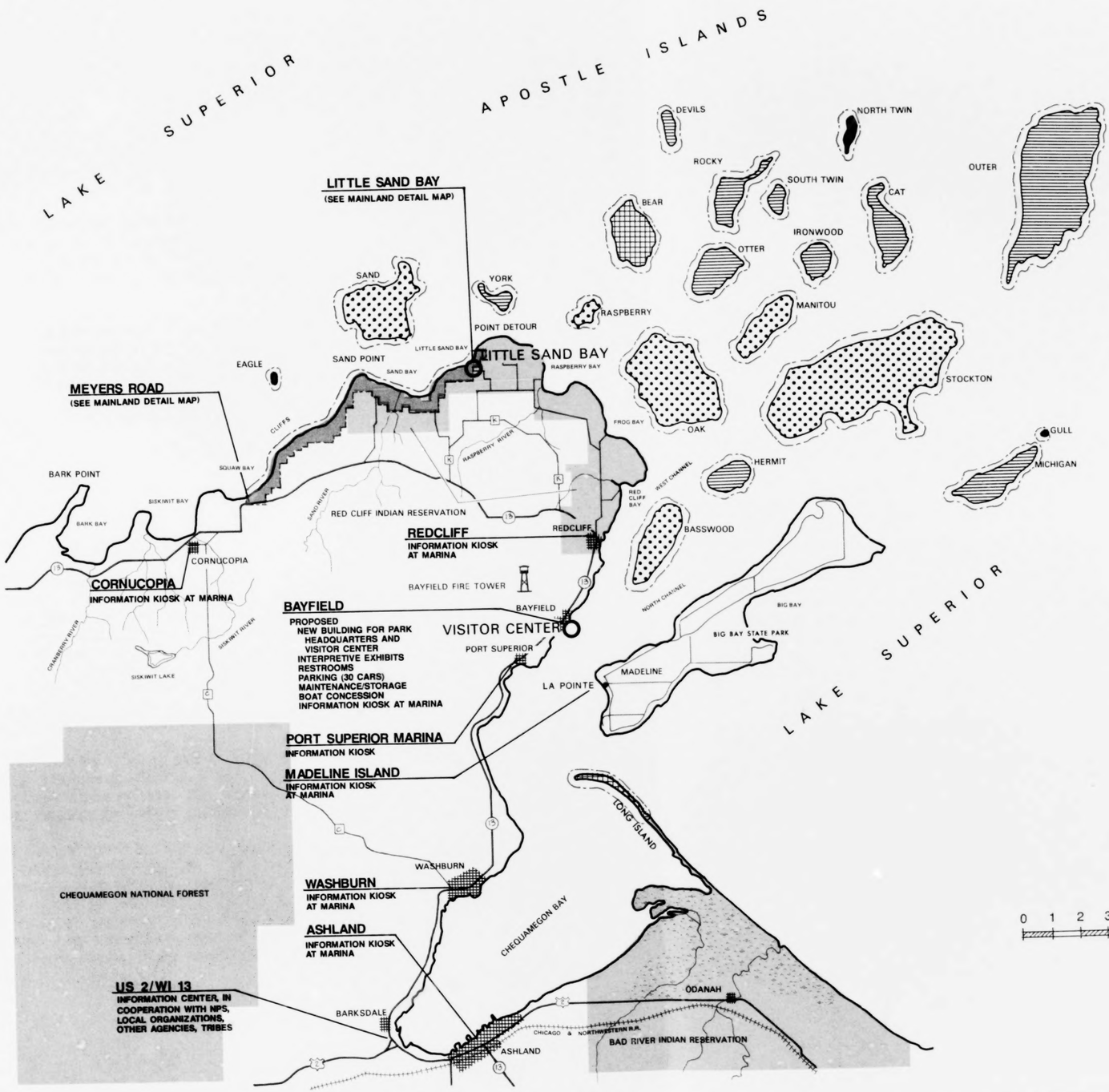

VISITOR USE AND ACCESS

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- FUTURE
- RESTRICTED
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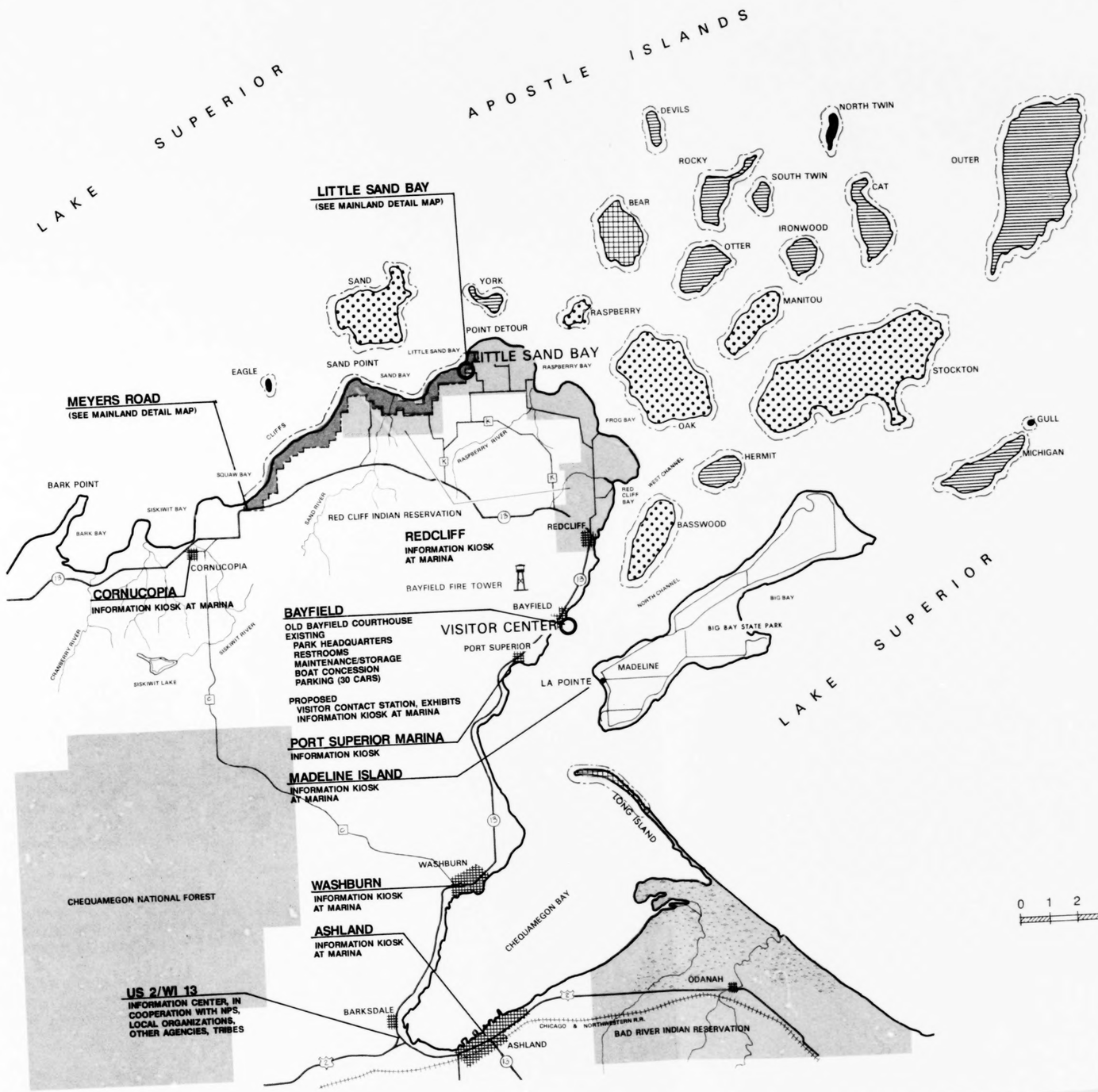
APOSTLE ISLANDS
NATIONAL LAKESHORE

UNITED STATES DEPARTMENT OF THE INTERIOR / NATIONAL PARK SERVICE
633 | 20,024
DSC | APRIL 88



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APOSTLE ISLANDS
NATIONAL LAKESHORE

UNITED STATES DEPARTMENT OF THE INTERIOR / NATIONAL PARK SERVICE
633 | 20,025
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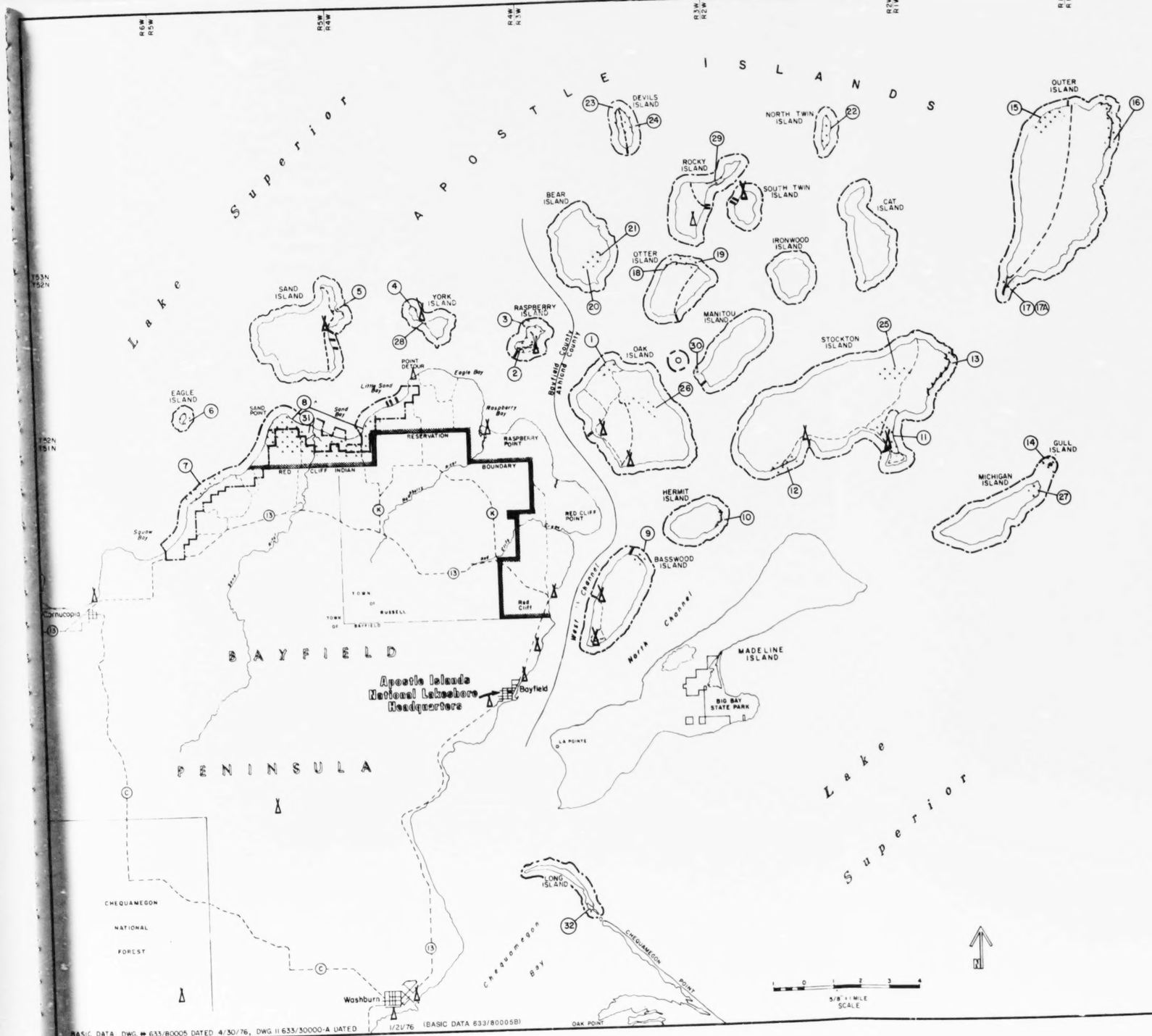


BASIC DATA DWG. # 633/80005 DATED 4/30/76, DWG. # 633/30000-A DATED 1/21/76 (BASIC DATA 633/80005B)

INDEX TO OUTSTANDING NATURAL FEATURES

KEY NO.	FEATURE	APPROX. AREA OR LENGTH
1.	Virgin sugar maple-oak forest	90 acres
2.	Unlogged forest	260 acres
3.	Small herring gull colony	100 meters*
4.	Small herring gull colony	150 meters
5.	Justice Bay sandstone cliffs	500 meters
6.	Herring gull-great blue heron colonies and double-crested cormorant	24 acres
7.	Sandstone cliffs	2300 meters
8.	Deer yards	1145 acres
9.	Small gull colony	100 meters
10.	Gull colony	200 meters
11.	Classic "tombolo"	418 acres
12.	Gull colony	1700 meters
13.	Sandstone cliffs	2800 meters
14.	Gull and double-crested cormorant colonies	3 acres
15.	Large stand of virgin hemlock	80 acres
16.	Sandstone cliffs	3400 meters
17.	Shorebird habitat	72 acres
17.A	South sandspit	121 acres
18.	Large gull colony	600 meters
19.	Rich stands of sandstone cliff-plants	500 meters
20.	Ancient upland bog and beaches	9 acres
21.	Virgin hemlock	14 acres
22.	Nearly unlogged forest	175 acres
23.	Gull nests; stands of sandstone cliff-plants; high sculptured cliffs	114 meters
24.	200–300 year old white pine	114 acres
25.	Ancient bogs and beaches	158 acres
26.	Ancient beach	86 acres
27.	Old growth, but small hemlock; great blue heron rookery	77 acres
28.	Tombolo	43 acres
29.	Tombolo	48 acres
30.	Small herring gull colony	
31.	Slough	
32.	Piping Plover nesting area	

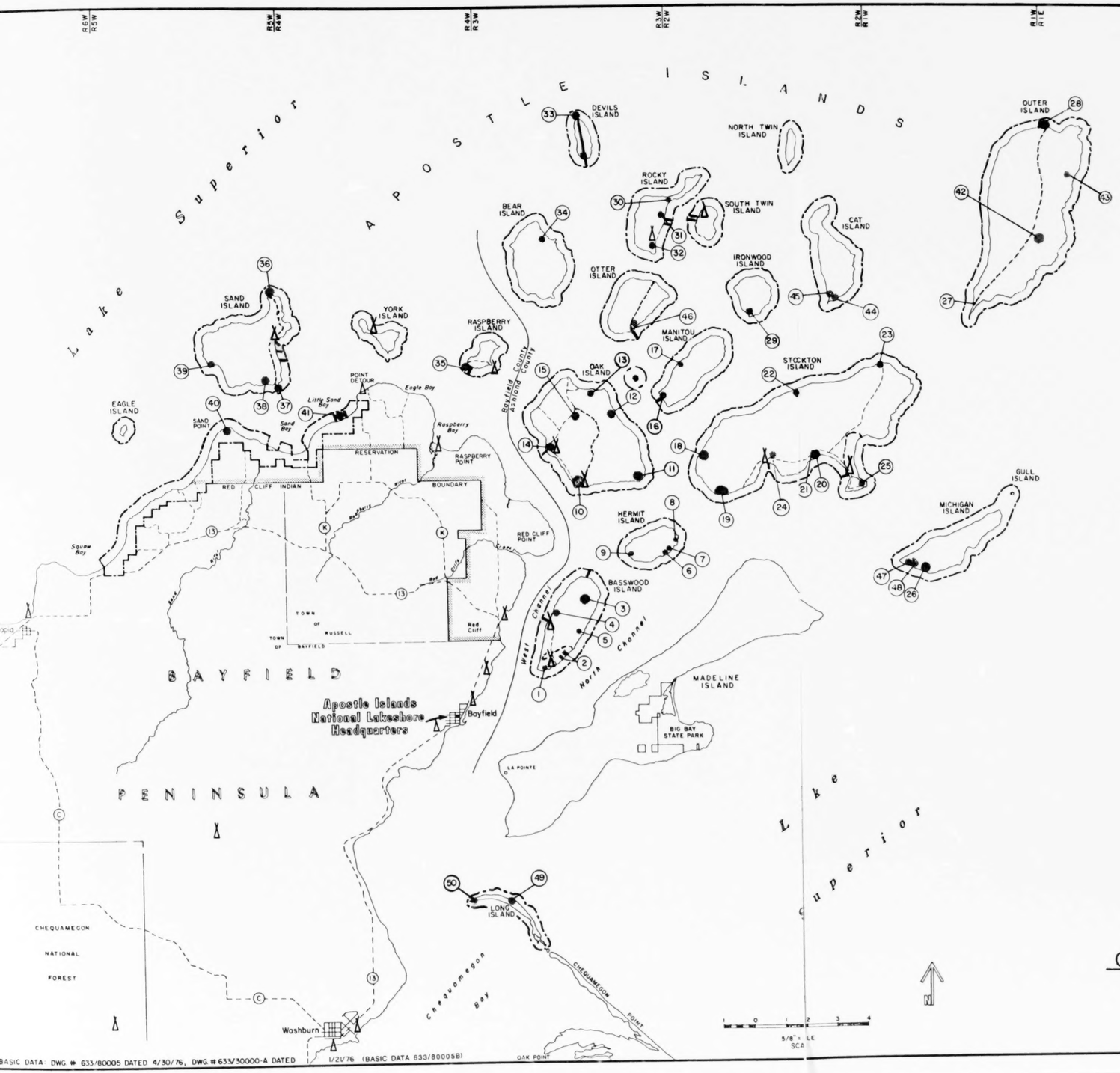
* METERS EXPRESS LINEAR MEASUREMENT OF SHORELINE; ACREAGES INVOLVED HAVE NOT BEEN DETERMINED.

LEGEND

- NPS BOUNDARY
- CAMPGROUND
- IMPROVED TRAILS (DOES NOT INDICATE ALL EXISTING TRAILS AND ROUTES OF 1981 TRAIL CONSTRUCTION).
- DOCKS

OUTSTANDING NATURAL FEATURES

MIDWEST REGION
SHEET 2 OF 3
DRAWING NO. 633 20042
DATE 5/12/81



INDEX TO OUTSTANDING CULTURAL RESOURCES

KEY NO.	FEATURE	APPROX. AREA
1.	**Bass Island Brownstone Co. Quarry***	15.00ac.
2.	**Breckenridge Brownstone Quarry**	5.00ac.
3.	McCloud-Brigham Farmstead	33.00ac.
4.	Rudd Farmstead/Logging Site	30.50ac.
5.	Farmstead	7.60ac.
6.	**Excelsior Brownstone Co. Quarry**	5.00ac.
7.	Cedar Bark Lodge site	0.01 ac.
8.	Farmstead	15.00ac.
9.	Hermit Wilson's home site	0.01 ac.
10.	Benjamin Armstrong cabin & clearing site	5.00ac.
11.	Lumber camp	13.60ac.
12.	Lumber camp	9.00 ac.
13.	Lumber camp	18.00 ac.
14.	Lumber camp	18.00 ac.
15.	Sugar Bush	34.50 ac.
16.	Manitou Fish Camp*	0.50 ac.
17.	Logging camp	9.00 ac.
18.	Logging camp	10.00 ac.
19.	**Ashland Brownstone Co. Quarry**	5.00 ac.
20.	Logging camp	17.50 ac.
21.	Fish camp	0.50 ac.
22.	Logging camp	12.50 ac.
23.	Logging camp (Trout Point)	7.50 ac.
24.	Logging camp; Fish camp; site of 1850 structure	1.00 ac.
25.	Early log structure	0.50 ac.
26.	Light station*	13.60 ac.
27.	**Logging Railroad landing**	0.01 ac.
28.	Light station*	13.60 ac.
29.	**Logging camp**	
30.	Hadland Bros. Fish Camp*	2.50 ac.
31.	Early lumber paymaster's office	2.50 ac.
32.	Nies Fish Camp	2.00 ac.
33.	Light station*	10.00 ac.
34.	Logging camp	5.00 ac.
35.	Light station*	7.50 ac.
36.	Light station*	2.50 ac.
37.	Shaw Farm*	(22.50 ac.
38.	Sevona Cabin*	(0.50 ac.
39.	West Bay Club building	(2.50 ac.
40.	1850's Survey Tower site	0.10 ac.
41.	Hokenson Brothers Fishery*	2.50 ac.
42.	Logging camp (Schroeder)	
43.	Logging camp (Lullabye)	
44.	Fish camp	
45.	Logging camp	
46.	Logging camp, Boy Scout Camporee Site	
47.	Fish camp	
48.	Railroad logging camp and landing	
49* and 50	— Light Stations	

*NATIONAL REGISTER PROPERTIES
()PROPERTY UNDER RIGHT OF USE AND OCCUPANCY.

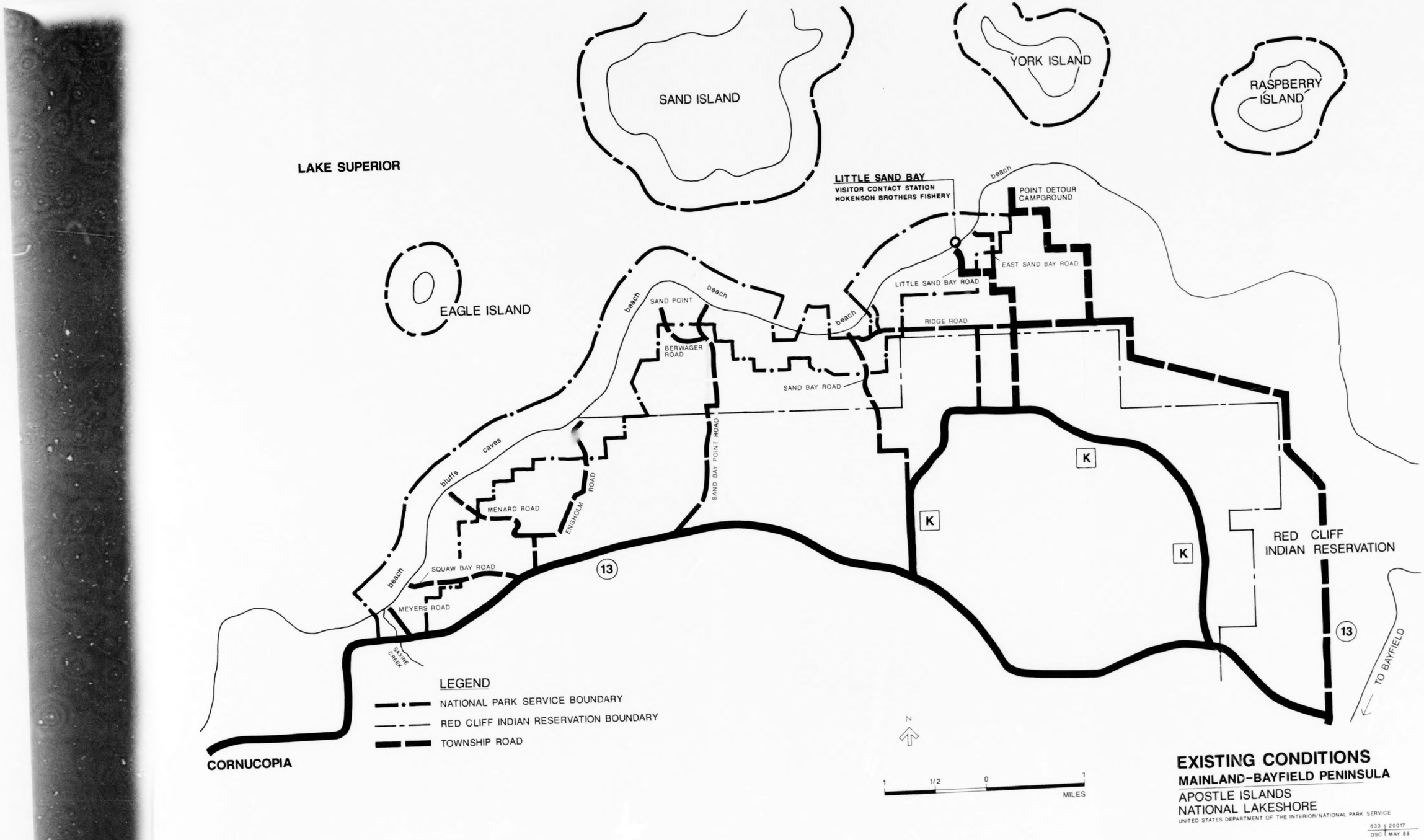
LEGEND

- NPS BOUNDARY
- CAMPGROUND
- IMPROVED TRAILS (DOES NOT INDICATE ALL EXISTING TRAILS AND ROUTES OF 1981 TRAIL CONSTRUCTION).
- DOCKS

OUTSTANDING CULTURAL RESOURCES

MIDWEST REGION	
SHEET 3 OF 3	
DRAWING NO.	633 20042
DATE 5/12/81	

BASIC DATA: DWG. # 633/80005 DATED 4/30/76, DWG. # 633/30000-A DATED 1/2/76 (BASIC DATA 633/80005B)



EXISTING CONDITIONS
MAINLAND–BAYFIELD PENINSULA

APOSTLE ISLANDS
NATIONAL LAKESHORE
UNITED STATES DEPARTMENT OF THE INTERIOR/NATIONAL PARK SERVICE

633 | 20017
DSC | MAY 88

EXISTING DEVELOPMENT

PARK GENERAL

APOSTLE ISLANDS
NATIONAL LAKESHORE

UNITED STATES DEPARTMENT OF THE INTERIOR / NATIONAL PARK SERVICE

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DSC	APRIL 88